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Railway Age

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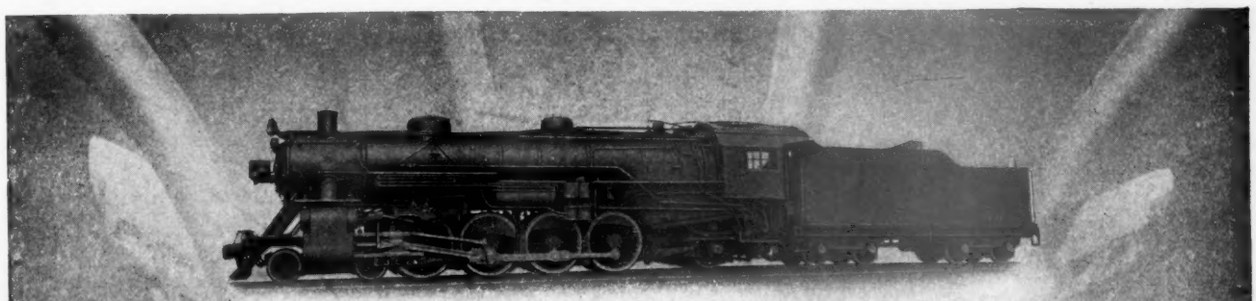

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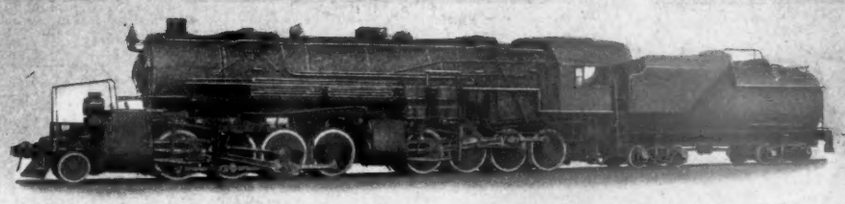

AMERICAN ARCH CO., INC.

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LARGEST CHAIN MANUFACTURERS IN THE WORLD

EDITORIAL

Railway Age

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The action of the directors of the Pennsylvania Railroad in reducing the dividend rate on Pennsylvania stock from one and one-half to one per cent quarterly did not cause as much excitement as might have been expected from a step so important and far-reaching. The possibility of a reduction in the dividend had been discounted and students of the railway situation had felt that the action taken was such as was to have been looked forward to under the present conditions of railroading. The unfortunate feature of the whole affair is that the Pennsylvania stock is widely held by small investors, to whom the reduction in the dividend and the accompanying decline in the value of the stock represents a real hardship. The Pennsylvania is recognized as one of the leading railroads of the world; prior to federal control its physical standards, its management and the morale of its men were recognized as being a model that other properties could look up to. The Pennsylvania System was hit hard by the many sins of omission and of commission of federal control. The officers of the property are now engaged in the tremendous task of remedying the situation and of bringing the system back to its old standards of accomplishment. With the national agreements, high wage scales and the delays attendant upon the changing of these things, they are not, judging from the monthly reports of earnings, having what might be called a glittering success. If any one wants an argument in favor of some kind of action before it is altogether too late on the part of the Railroad Labor Board, we believe that this reduction in the Pennsylvania dividend is as good a one as can be found.

The Pennsylvania Dividend

The legislature of Pennsylvania has repealed the full crew law of that state—after the said law has wasted about forty millions of dollars. The final vote was taken on April 28. Whether or not the news about the Pennsylvania's dividend, published the day before (that the company had been obliged to reduce the rate to a figure lower than that of any former year since 1880) had an influence on the minds of the legislators, does not appear; but the coincidence is noticeable. A good many citizens of Pennsylvania own stock in that railroad, and the legislators have, no doubt, heard from some of them. A reduction of 33 per cent in a stockholder's income will open some mouths which have long been silent. This Pennsylvania law has been in force almost ten years; and if there is any virtue in reviewing the mistakes of the past, these stockholders may well ponder this matter; may well ask themselves what kind of men they have been sending to the legislature during the years since 1911. Truth crushed to earth will rise again, though oftentimes it rises with exceeding slowness. The truth that full-crew laws are wasteful and unnecessary, and are substantially nothing but blackmail, has been fully evident, to everybody who cared to look, on every day since that law was passed. Railroad stockholders, outside of Pennsylvania, who may not be interested in the loss of 40 millions in ten years in that state, will do well to reflect that 40 millions *in one year* is the estimated aggregate of the present cost of the full-crew laws in all of the states which keep up this foolishness. Not every stockholder can reach the legislators who rule his railroad—his position may be like that of an absentee landlord—but every stockholder has a duty to make his voice heard. If he can speak with the right tone and force, the Associated Press will telegraph his words to every state in the Union within 24 hours after they are uttered.

One Full-Crew Law Repealed

The recommendations of the governors' committee of the New England states, which are reproduced on another page of this issue, are to the effect that the executives of the New England roads have not shown that an increase of ten per cent in freight rates and passenger fares will remedy the New England situation or that with such an increase New England's interests will not suffer. This means that another of the several efforts of the New England carriers to remedy their situation has come to naught. The real gist of the committee's recommendations seems to lie, however, as much in its expressions of opinion concerning the railway situation of the country as a whole as in its comments on the desirability of the suggested increase in rates. The committee makes some rather far-reaching proposals, some of which will be generally agreed with and others of which will probably meet with opposition. It will be agreed that the government should be more prompt in fulfilling its obligations toward the railroads as to paying the amounts due them. The proposal that the period of federal guaranty should be extended, retroactive to September 1, 1920, will probably not be so readily accepted. One of the recommendations says, "We believe Congress should consider whether the present method of settling labor disputes is entirely adequate, and if not in what respect it may be remedied or altered." This is a thought that is undoubtedly being brought to the minds of many other observers; the expression of it emphasizes that the realization that railroad progress is waiting upon the Labor Board is becoming more wide-spread from day to day. It is rather evident from the committee's decision as a whole that the New England states are not prepared, as yet at least, to take it upon themselves to solve the New England railroad problem. They apparently feel that since it was the national government that brought on federal control, it is the national government's duty to bring about the remedy of the faults of federal control. Apparently, however, the committee does not believe that the government thus far has done as much to remedy the situation as might be wished.

New England Increases Opposed

Railroad repair shops and enginehouses are greatly in debt to the electric storage battery truck as a means for transporting material of all kinds from one department to another promptly and at a low cost. Second only to the scientific layout of shops, departments, machinery and equipment, is the need for wide, clear passage-ways and rugged, reliable, power-operated trucks. Hard, smooth walks should connect all shops and buildings and inside the shops passage-ways from one department to another should be kept clear. Some

Railroad Shop Transportation Systems

form of motor truck, operated either independently or with trailers, should be used for transporting locomotive parts and other material from one place to another. While other forms of motive power may be used, the electric storage battery truck, on account of its ease of operation, reliability and relatively low cost, has won high favor for this purpose. Not only should all possible hand trucking be eliminated but careless, irregular operation of motor trucks should also be discouraged. In many shops a schedule of truck operation has been installed whereby the trucks leave certain points at specified times; for example, every hour. This scheduling greatly facilitates the movement of material and in many cases has been developed to such a state that the shop may accurately be said to have a transportation system. As a means of obtaining more economical shop operation and increasing capacity, railway shop managers can hardly do better than attend to the construction or improvement of walks and passage-ways between shops and outline systematic shop transportation systems. The advantages consist not only in moving material at a reduced labor cost, but the actual production of individual departments will be increased. As soon as a machine part has one operation completed, it should be moved promptly to the next machine. This accomplishes two purposes; it shows the man who has just completed the operation that the part is needed and it enables the man who is to perform the next operation to see what work is ahead of him. No man is going to speed up his production if he sees only a little work ahead which can be completed in a short time. The result of promptly moving material and keeping work always ahead of the men will be a surprisingly large increase in shop output.

William Hood, Railroad Builder

The retirement of William Hood from active service as chief engineer of the Southern Pacific, as noted elsewhere in this issue, marks the passing of a period in American railway history. William Hood has been a railway builder and his principal activities have been in that portion of the United States where pioneer railroading has had its longest lease of life. The railway engineer of the newer type studies the railroads as a field for more intensive development. Mr. Hood stands foremost among those who studied the undeveloped country as a place to build railroads. His career has been one of unusual human interest, notwithstanding the fact that his entire active railway service of over half a century has been devoted to one property. Of particular note is the fact that it commenced in 1867 with employment in a minor capacity on the construction of the Central Pacific through the Sierra Nevadas during the drive to complete the first transcontinental line. This initial section of the present Pacific system of the Southern Pacific was then only 90 miles long and the 7,000 miles of line which have since been added to the Pacific system were built largely under his direction, for whether he was locating engineer, assistant chief engineer, or chief engineer, the position he occupied for the last 37 years, his place was always out on the line where the location was being fitted to the country. Mr. Hood has always been a leader in that school of railway men who believe in the gospel of "It can be done." By the same token he has been no respecter of the conventional when it came to the selection of the method. The Lucin cut-off testifies emphatically to this and to his courageous loyalty to his established convictions. His particular value to his employers may be ascribed primarily to his profound knowledge of the detailed topography of the territory naturally tributary to the Southern Pacific lines. This made him a tower of strength in the days of competitive railway building and of particular economic value in the later days of more conservative railway projection. With the virtual closing of the period of great railway extensions in this country, Mr. Hood has earned a well merited retirement with his work completed.

Patience Needed in Rate Readjustment

THE OPINION is quite commonly held, particularly among people whose impressions and knowledge of railroad conditions are somewhat more general than those they hold regarding their own business, for example, that high freight rates are a very important, if not the most important factor in, or cause of, the general business depression which is attending our efforts to get readjusted from wartime to more normal conditions. Herbert Hoover, Secretary of Commerce, is one of the most prominent of those whose remarks, at least as quoted or reflected in the newspapers, would tend to create such an impression. President Harding is understood to have expressed similar views in his talks to newspaper men and such an impression might easily be gained from his address at the opening of Congress. We are not aware, however, that either of these gentlemen has expressed himself specifically on the question which is being much discussed as to whether rate reductions should precede or should merely be expected to follow important reductions in the operating costs which are the cause for the high rates.

Mr. Hoover's address before the United States Chamber of Commerce at Atlantic City last week indicates that perhaps he is less radical or less impatient on the subject than a mere statement that "rates are too high" might indicate. He refers to "complaints" that the latest increase in rates is stifling production, and he says "we must look forward to *ultimate* reductions in rates if the economic levels of the country are to find an equilibrium," but that is quite different from the demand being made in some quarters for an *immediate* reduction in rates as the primary requisite of the situation.

Since Mr. Hoover is so looked to as an oracle we should like very much to see him develop a little further the thought he expressed in saying, "Part of the bitterness of the situation arises from the inequalities in the progress of these readjustments in the different walks of life and in different branches of industry." To illustrate this he presented a table comparing recent commodity and labor indexes as compared with a 100 pre-war basis (apparently 1913) which showed that while railroad receipts per ton-mile have increased to 166, farm prices for crops are now at 115, farm prices for animals 123, wholesale food 150 and retail food 156, while building materials are 212, the New York Industrial Commission wage index is 212 and the Department of Labor union wage index is 199. He omits the Department of Labor index of wholesale prices, which was 162 for March, and we believe it is generally agreed that retail prices have fallen less than the wholesale prices. This table would seem to indicate that the freight rates are not so far out of line as to prove that they are the chief factor in the situation. It indicates that the producers of farm products, whose prices are fixed by the market without much reference to cost, are at present less successful than other industries in passing their costs along to the consumer, but we fail to find in it any argument that the railroads, that for 28 months were specifically limited to their pre-war profits and are now as a whole earning less than their operating expenses, should be the first to hasten to the aid of the farmers. The idea that they should is undoubtedly due to the fact that we have got into the habit of regulating freight rates while we have not developed to any great extent a practice of regulating prices, although to attempt to regulate prices through the medium of freight rates is to try to make the tail wag the dog. We refrain from saying that the farmer "got his" during the war,

while the railroads did not, because we are aware of his claim that the guaranteed price of wheat, which most people think represented a large profit, in reality represented a restriction, just as railroad men know that their guaranty, which the farmer thinks represented a huge profit, was in reality a restriction.

Possibly if we had an all-powerful Interstate Commerce Commission with a jurisdiction as broad as its name instead of being restricted mainly to the transportation side of commerce, it might proceed to correct the discrimination indicated by Mr. Hoover's table by ordering a general reduction of wages, a smaller reduction in wholesale and retail prices, somewhat less of a reduction in freight rates and perhaps an increase in the prices of farm products. Undoubtedly if every one knew that everybody else were to have his wages or prices cut he would soon discover that his own compensation could stand a cut of similar proportions, because of the increased purchasing power of his money, but it would seem rather hard to ask the last man to have his units of income inflated begin the process of deflation. Prices and wages have for several years kept a couple of jumps ahead of the increases in freight rates. The fact that the governmental policy which postponed the latest advance until some of the other prices had begun to fall naturally magnified the effect of the rate increase and leads to irritation but does not change the fact that freight rates are not relatively high.

Mr. Hoover questions "the continued use of an emergency horizontal basis of rate increases" and says that "even though the same total income must be earned by the railways there must be a commodity and class readjustment in rates both in the interest of the community and the railways themselves."

He adds that such a readjustment was forecast by the Interstate Commerce Commission as a necessity at the time of the rate increase and he might have added that no one disputes his point, except where it is made in total disregard of the cost of performing the service.

Limitations on Economical Speed of Trains

IN AN ARTICLE elsewhere in this issue, the effects of increasing running speeds on the energy required to perform a given train movement is discussed by G. S. Chiles and R. G. Kelley, whose conclusions are based on the results obtained in the University of Illinois train resistance tests. There has been some reluctance to accept the results of these tests so far as they apply to low speeds because in road tests conducted primarily for tonnage rating purposes or to study locomotive performance, other unmeasured variables have masked the effects of any tendency toward increasing train resistance for speed increases from five to fifteen or twenty miles an hour which might have existed. Considering the accuracy with which the University of Illinois test data were obtained and the care used in arriving at the conclusions stated, it seems probable that were a sufficiently large number of train movements considered to average out the effect of variable weather conditions and differences in the condition of equipment, the effect of speed increases in increasing train resistance would be evident within the common rates of freight train speeds. In any attempt to determine the most economical freight train speed this tendency cannot safely be dismissed without consideration.

Another factor which must also be taken into account is the characteristics of the locomotive itself. In most discussions of steam locomotive capacity there is a tendency to place great stress on its horsepower characteristics. From an engineering standpoint this may be justified, and in the case of passenger locomotives where the maintenance of schedules requires the operation of the locomotive to its full capacity at high speeds, the horsepower is a practical unit for measuring capacity. In the case of freight locomotives, however, the horsepower unit is misleading. By inference it leads to the erroneous assumption that full power capacity may be utilized advantageously irrespective of whether it be attained at low speed with a high tractive effort or at high speed with a low tractive effort.

The full horsepower capacity of modern freight locomotives will probably not be reached at speeds much under 30 to 35 miles an hour and in operating to capacity the most economical fuel rate will not be reached short of these speeds. Now, considering the utilization of the locomotive purely from the standpoint of the amount of work produced per unit of distance rather than per unit of time, it will be found that a given tractive effort may be maintained with a materially smaller coal consumption per mile at speeds considerably below the maximum speed that may be attainable with that tractive effort.

This matter is of importance in considering the economical speed of freight trains because of the fact that the conditions which fix the maximum tonnage usually apply for a comparatively small portion of the total distance over an operating district and hence, if the full horsepower capacity of the locomotive is to be utilized with the reduced tractive effort required over the remaining portions of the district it can only be done by increasing the speed, frequently well beyond the point at which overtime ceases. From the standpoint of operating expenses such speeds are detrimental because of the fact that above, say, ten miles an hour the lower the speed at which a given tractive effort is maintained the lower the cost of fuel per 1,000 gross ton-miles. For instance, one modern Mikado type locomotive capable of developing about 65 per cent of its maximum tractive effort at a speed of 25 miles an hour can do so only at the expense of a 36 per cent increase in the amount of fuel per unit of work produced, over the amount required to maintain the same tractive effort at 20 miles an hour, while the increase in the fuel consumption per unit of work required to maintain the maximum speed of 25 miles an hour over that required to operate at 15 miles an hour is about 55 per cent. This fact is well recognized in every-day operating practice in the attempts which are made to determine the most economical cut-offs for a given set of conditions, rather than the cut-off which will produce the highest speed. In discussions of locomotive capacity in terms of horsepower, however, it is not infrequently overlooked.

The same effect on fuel consumption, though to a less marked degree, will be produced if the running speed of a freight locomotive is increased at the expense of the train load, that is, by keeping the cut-off within the economical range, which will probably be around 50 per cent in most cases. In a range of speed from 10 to 25 miles an hour under these conditions, there will probably be an increase in the cost of fuel per unit of work performed of 10 or 15 per cent. Whether running speeds higher than those now commonly employed are obtained by working the locomotive nearer to its horsepower capacity or by reducing the tonnage and maintaining the most economical cut-off, there is likely to be a material increase in the coal consumption per unit of work performed.

The tendency of speed increases to increase both the fuel cost per unit of work and the amount of work to be done for a given gross ton-mile movement creates a direct charge against the saving in wage costs effected by reducing overtime which may make it cheaper to pay some overtime if high running speeds are necessary for its complete elimination. In any case, it is evident that reductions in crew overtime can best be obtained by providing facilities, both road and terminal, by which delays may be eliminated. Fuel as well as wage costs will thus be reduced and there will not be the

increase in enginehouse expense which would follow the increase in train mileage made necessary if the higher running speeds were obtained by tonnage reductions.

The "Fancy" Salaries of Railway Officers

IN THE indictments which somebody always is drawing against the managements of the railways there always is included the charge that they pay their officers excessive salaries. Hardly a day passes that somebody does not publicly and solemnly allege that if the railways would eliminate the "waste" due to "fancy" salaries they could pay their employees more or reduce their rates. The other day a member of Congress introduced a bill to provide that in future no railway company pay any officer more than $15,000 a year without the previous approval of the Interstate Commerce Commission.

Of all the asinine charges made against the managements of the railways this one about excessive salaries is perhaps the most asinine. It may cause some astonishment to those who believe the railways waste large amounts in salaries to be told that if in the year 1920 they had not paid a dollar of salary to any of their 22,000 general and divisional officers their total payroll would have been only 2.5 per cent less than it was, and their total operating expenses would have been only 1.7 per cent less than they were.

All of the alleged "fancy" salaries are included in those paid to the general officers. The general officers include all the chairmen, presidents, vice-presidents, general managers, traffic managers, and so on; and many people believe that since some of these officers receive $50,000 to $75,000 a year the total amount paid to them is enormous and the burden imposed on the railways and the public very great. People who think thus will be surprised to learn the statistics of the Interstate Commerce Commission show that if the railways in the year 1920 had not paid a dollar of salary to any of their general officers their operating expenses would have been less than six-tenths of one per cent less than they were. To state the matter in another way, if not a dollar of salary had been paid to any general officer the operating expenses would have been 99.42 per cent as much as they actually were.

Since the extravagant talk about railway salaries is always being renewed, we have had compiled and publish in an accompanying table statistics showing the total compensation paid to railway officers in each of the years 1916 to 1920 inclusive, together with the total compensation paid to all officers and employees, the total operating expenses incurred, and the total earnings earned in these years.

	1916	1917	1918	1919	1920
Total compensation all officers and employees	$1,468,576,394	$1,739,482,142	$2,613,813,351	$2,843,128,432	$3,698,216,351
Total compensation all officers	$53,273,758	$57,346,610	$65,551,316	$77,435,168	$92,460,835
Per cent of officers' compensation to total compensation all employees	3.6	3.9	2.5	2.7	2.5
Total operating expenses	$2,426,250,521	$2,829,325,124	$3,982,068,197	$4,419,441,949	$5,826,197,474
Per cent officers' compensation to total operating expenses	2.2	2.0	1.6	1.7	1.7
Gross earnings	$3,691,065,217	$4,014,142,747	$4,880,953,480	$5,184,064,221	$6,225,402,763
Per cent officers' compensation to gross earnings	1.4	1.4	1.3	1.5	1.5

In 1916 the salaries of all officers, general and divisional, were 3.6 per cent of the total payroll (including both the salaries of officers and the wages of employees); in 1917, 3.9 per cent; in 1918, 2.5 per cent; in 1919, 2.7 per cent, and in 1920, 2.5 per cent. In other words, in these years the wages of the employees amounted to from 96.1 to 97½ per cent of the total payroll.

In 1916 the salaries of all officers were 2.2 per cent of the total operating expenses; in 1917, 2 per cent; in 1918, 1.6 per cent; in 1919 and 1920, 1.7 per cent. In other words, if not a dollar of salary had been paid in these years to a single officer the total expenses would have been from 97.8 per cent to 98.4 per cent of what they actually were.

In 1916 and 1917 salaries of all officers were 1.4 per cent of the total earnings; in 1918, 1.3 per cent, and in 1919 and 1920, 1.5 per cent. In other words, in these years, out of each dollar that the public paid for all kinds of railroad transportation, freight, passenger, mail and express, the officers as a whole received from 1.3 cents to 1½ cents. In 1920 out of each 100 cents the public paid the railways, the general officers, including all those with alleged "fancy" salaries, received 7.5 *mills*.

In recent discussions of needed reductions of the railroad payroll, it repeatedly has been suggested that if wages are to be reduced the salaries of officers should be reduced in proportion. Let us see, then, what have been the relative increases in salaries, on the one hand, and wages on the other, since 1916. In 1916 the average salary of a general officer was $4,508, and in 1920 it was $5,542, an increase of 20.7 per cent. In 1916 the average salary of a division officer was $1,998, and in 1920 it was $3,319, an increase of 66.1 per cent. The average pay of passenger locomotive engineers and motormen in 1920 was $3,310, or only $9 less than that of division officers. Between 1916 and 1920, however, the average compensation of all employees increased 104 per cent, and it is now almost 114 per cent more than in 1916. Since the advances in salaries of officers as a whole have been relatively less than half as great as in the wages of employees, and have not at any time even approached the increases in the cost of living, while the advances in wages have exceeded the increases in the cost of living, it is wholly unfair to suggest that if wages are to be reduced salaries shall be reduced in the same proportion.

The only year for which the salaries of all officers receiving $20,000 or more have ever been published is 1917. The figures for that year showed there were 200 officers who received this much or more and that their total compensation amounted to $6,644,074. This was 2.3 *mills* out of each dollar of operating expense the railways incurred in that year and 1.6 *mills* out of each dollar they earned. There were only 29 officers who received $50,000 or more and their total compensation was $1,900,000. This was two-thirds of one *mill* out of each dollar of operating expense the railways incurred and one-half of one *mill* out of each dollar of their total earnings. The ratios of the salaries amounting to $20,000 or more and of those amounting to $50,000 or more to total operating expenses and total earnings in 1920 undoubtedly were smaller than they were in 1917.

These figures demonstrate conclusively that no reduction of salaries that conceivably could be made would have any perceptible effect in reducing the operating expenses that the railways incur or the rates that they must charge. The fact is that salaries as a whole in the railway business are low as compared with those paid in other industries, and that even the largest salaries paid are small compared with the earnings of successful men in other lines of professional and business activity. When people talk about salaries of $25,000 to $75,000 a year in the railroad business being excessive, they do not stop to think that successful men in almost all other lines of business make larger incomes than this. There is hardly an opera star or a moving picture star who does not earn much more. The public goes to the movies night

after night and indirectly pays Charlie Chaplin many times as much for getting his face bespattered with pie as it pays any man in America for managing a great railroad system.

How long would men of ability and ambition enter or stay in the railroad business if they knew that there was no opportunity in it to earn incomes comparable with those earned in other lines of professional and business activity? Hardly a month passes when men of this kind do not leave the railroads to accept higher salaries than the railways will pay. Remove all the large prizes from the business and within a generation there will hardly be left in it a man of ambition and ability. But it is absolutely necessary to have such men in important positions if the railroads are to be efficiently developed and managed; and if they are not efficiently developed and managed their service is bound constantly to grow worse and more expensive to the public.

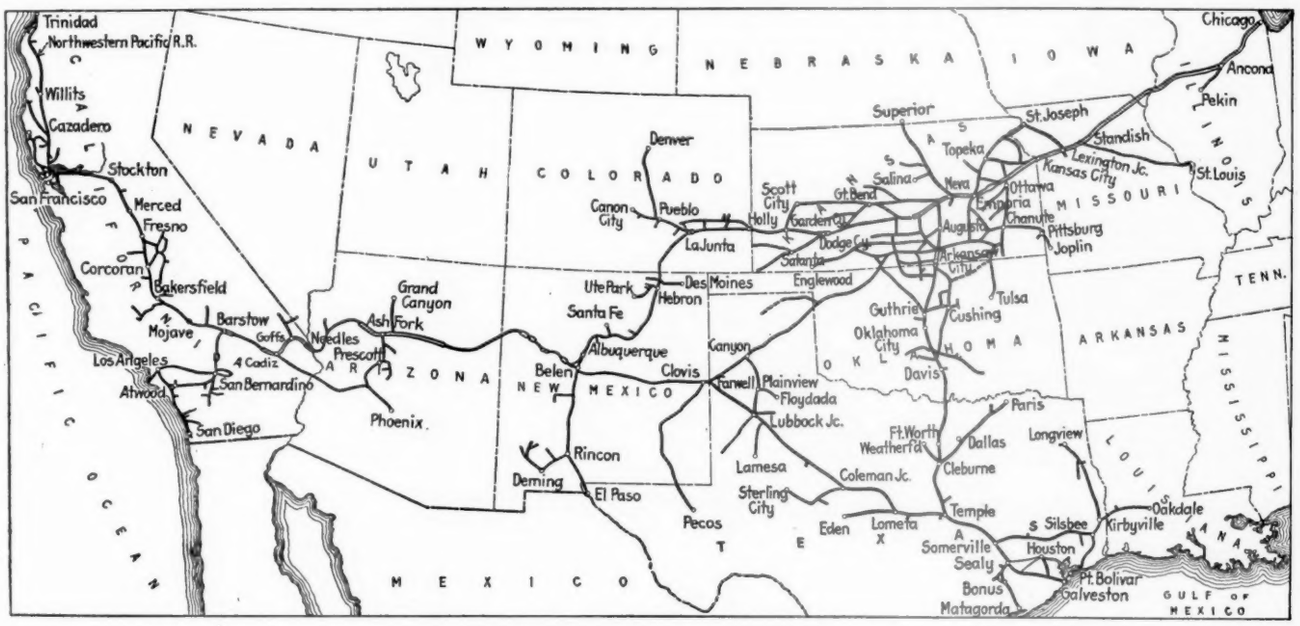
Atchison, Topeka & Santa Fe

THE ANNUAL REPORT of the Atchison, Topeka & Santa Fe for 1920 and the figures of operation of that system for the first two months of the present year furnish about the most effective reply that we have yet seen to the fanciful and misleading propaganda which the labor economist, W. Jett Lauck, has been expounding for the past few weeks. Mr. Lauck has secured wide circulation for the published statements containing his charges of inefficiency in railroad operation, which he has been issuing in his attempts to divert the public's attention from the real issues before the Labor Board.

The Santa Fe system is one of the very few properties that earned a net for the government during the federal control period. Its net railway operating income, as defined in the federal control act, for the 26 months of federal control, as stated on the federal books, was $98,919,277, whereas the standard return for the federal control period was about $95,000,000. This earning power was further evidenced during the year 1920. The net railway operating income for 1920, that is, without taking into consideration the standard return for January and February and the guaranty for the guaranty period, was $24,005,615. In other words, the system would have been able, without the standard return or the guaranty, to pay the usual 5 per cent dividends on its preferred and 6 per cent on its common stock, which, in 1920, amounted to $19,649,795. These figures characterize the Santa Fe as very much of an exception.

The Santa Fe is recognized to be almost all that a railroad property ought to be. It is built through a territory of great traffic possibilities; its roadbed and equipment are in exceptionally good shape despite the deferred maintenance of the federal control period. The system is efficiently operated and the character of its high grade service, both freight and passenger, is too well known to need comment. The question that might arise is what is the system doing at present. Perusal of the monthly reports to the Interstate Commerce Commission shows that for the first two months of the present year it had a net railway operating deficit. It did not even earn its fixed charges, still less its dividends.

We submit that the fact that a road like this—one of the very few which earned a net for the government during federal control and which in 1920 earned enough from operations to have paid its usual dividends—failed to earn its fixed charges in the first two months of 1921, is most disconcerting. It indicates how really serious the railway situation has become and shows how prompt must be the measures taken to remedy it. We are nevertheless optimistic on the railway situation in general and particularly on the Santa Fe. Measures to remedy the situation in general are being taken by the one man who can probably do the most toward securing results, namely, President Harding. There can, of course, be no question that whatever improvement may be made in the railway situation or in business, conditions will be promptly reflected in Santa Fe earnings.



The Atchison, Topeka & Santa Fe

The net railway operating income for operations in 1920 was given above as $24,005,615. This compared with $38,035,651 in 1919. The explanation should be made, however, that for the purpose of approximating the amount of the maintenance to which the company was entitled under the Transportation Act, it set up an equalization reserve for maintenance. In creating this reserve there was charged to maintenance of way and structures and maintenance of equipment an amount of $13,374,956 in excess of the expenditures for such purposes and the normal depreciation and retirement charges usually made by the company. "The setting up of these equalization accounts, it is noted in the annual report, which has not heretofore been customary for this company, is

reflected in the amount of $14,030,036 in the decreases in the net railway operating income (corporate and federal) for the year 1920."

The corporate income account for the year, in which is taken into consideration the standard return for January and February and the guaranty for the guaranty period, shows a net corporate income of $37,634,752 as compared with $43,098,658 in 1919, or $28,348,433 in 1918. The usual dividends of 5 per cent were paid on the preferred stock and 7 per cent on the common. These dividends with the addition of certain small appropriations to fuel reserve and sinking funds amounted to $19,753,292, so that there was a surplus carried to profit and loss amounting to $17,881,460.

The Santa Fe system in 1920 carried 36,850,553 tons of freight as compared with 31,811,576 in 1919. The revenue ton-mileage was 12,806,128,501 in 1920; in 1919, 11,931,107,874. The Santa Fe secures an unusually long haul on the freight it carries; in 1920 the average haul was 348 miles; in 1919 it was 375. Although the business done in 1920 was in excess of that done in 1919, it was about on a par with that done in previous good years. During the latter part of 1919 and up to the latter part of 1920, with the exception, of course, of the period last April, when operations were handicapped by the outlaw strike, the Santa Fe was handling a tremendous volume of freight traffic. This traffic did not continue during the last four months of 1920 when the road was operating on its own. The falling off since November has been especially marked, the traffic handled in December, January, etc., being at a low level.

The Santa Fe system as a whole comprises 11,675 miles of line. Covering such an extended area as it does, it is to be expected that its traffic should be well diversified. In 1920 products of agriculture made up 20.83 per cent of the total tonnage; products of animals, 4.08 per cent; products of mines, 35 per cent; products of forests, 7.75 per cent, and manufactures and miscellaneous, 27.39 per cent. Because of its well located line in the San Joaquin Valley of California and its many feeders in the region inland from Los Angeles the system is in an especially favorable position for handling the many varied products of that territory, and because of its direct line to the east it is able to offer a fast service on which it gets a long haul. The road's operations are not characterized, however, by heavy train loads or by a high figure of ton-miles daily per car. The net tons per train—revenue and non-revenue freight—in 1920 were 569. This compared with 557 in 1919 and represents a progressive increase over many years, the average train load in 1916 being 442; in 1917, 468, etc. In 1920 the average load per loaded car was 23.12 as compared with 22.23 in 1919. The average revenue per ton in 1920 was $4.57; per ton mile 1.316 cents. The average haul was, as noted above, 348 miles.

The story of the expansion and improvement of the Santa Fe for the past two decades is one of the epics of American railroading. This expansion and improvement was continued in a degree during 1920. The mileage of the system at the beginning of the year was 11,483, at the end of the year, 11,674, an increase of 191 miles. This increase was brought about principally through the following developments: The Buffalo Northwestern, extending from Waynoka, Woods County, Okla., to Buffalo, Harper County, 51 miles, acquired while partly completed, was finished and placed in operation July 1. The North Texas & Santa Fe, Shattuck, Ellis County, Okla., to Spearman, Hansford County, Texas, 85 miles, was placed in operation July 1. Extensions of the Minkler Southern from Porterville, Calif., to Ducor, 12 miles, and from Oil Junction to Bakersfield, 3 miles, were placed in operation July 15. Trackage rights over the Southern Pacific between Ducor and Oil Junction, secured in a contract effective also July 15, give the Minkler Southern its necessary outlet.

Considerable improvement has also been effected in the way of equipment. The total number of locomotives owned on December 31, 1920, was 2,188. The average tractive effort of these locomotives was 37,898 lb. as compared with an average tractive effort of locomotives on January 1, 1920, of 36,741 lb., an increase of 3.1 per cent during the year. The Santa Fe was allocated 2,700 forty-ton double sheathed box cars by the Railroad Administration, which equipment was financed through the equipment trust agreement made between the Director-General, the Guaranty Trust Company and the railroad. None of the standard locomotives were allocated to the Santa Fe system by the U. S. R. A. During 1920, however, orders were placed by the road for 30 heavy Mikado, 10 Santa Fe and 10 Mountain type locomotives and for 500 gondola and 2,500 refrigerator cars. These orders have since been supplemented by orders placed in March, this year, for 1,300 gondola cars. The Santa Fe is noted for being a careful buyer of equipment, more particularly because it generally places an order or two in times of depression when prices are at their lowest. It is significant, therefore, that the order mentioned as placed in March this year is one of the very few which have been placed by railroads since January 1, 1921.

The figures for operation for 1920 as compared with 1919 are given as follows:

	1920	1919
Operating revenues—		
Freight	$168,472,129	$144,743,867
Passenger	63,473,165	52,982,906
Total operating revenues	254,249,002	209,500,004
Operating expenses—		
Maintenance of way and structures	*48,832,692	29,322,158
Maintenance of equipment	*63,039,846	46,020,979
Traffic	3,173,385	1,976,515
Transportation	98,515,309	75,529,553
General	5,216,198	4,421,588
Total operating expenses	218,077,115	156,642,823
Net operating revenue	36,171,887	52,857,181
Railway tax accruals	12,004,141	12,510,735
Railway operating income	24,117,311	40,304,204
Net railway operating income	24,005,615	38,035,651

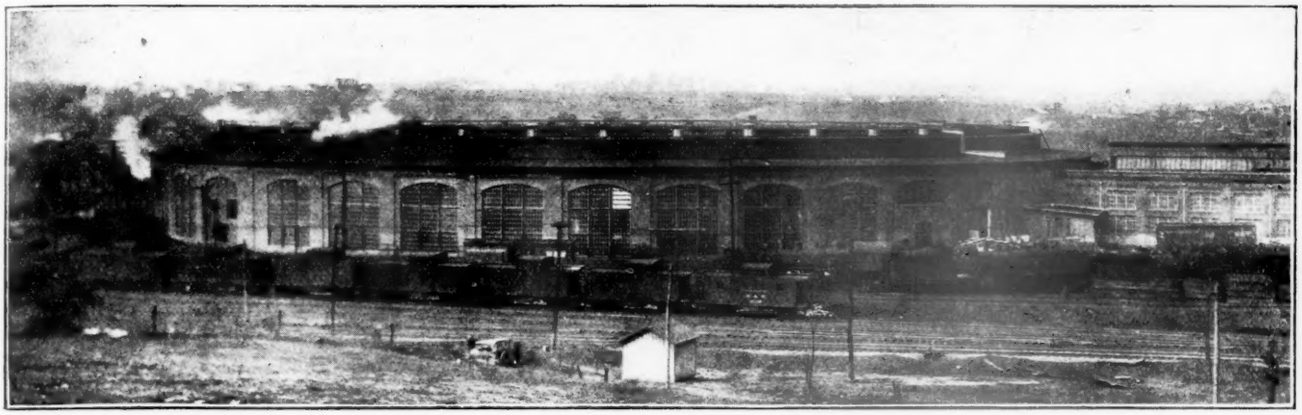
*Including equalization charges.

The corporate income account is given in brief as follows:

	1920	1919
Standard return, 1919	.....	$44,615,087
Standard return, Jan. and Feb., 1920	$7,699,531	.....
Guaranty, Mar. 1 to Aug. 31	22,553,225	.....
Operating income, Sept. 1 to Dec. 31	12,983,725	.....
Other income	9,842,116	15,100,116
Gross income	53,078,597	59,715,203
Net income	37,634,752	43,098,658
Dividends—		
Preferred, 5 per cent	6,208,685	6,208,685
Common 6 per cent	13,441,110	13,351,695
Surplus	17,881,460	23,438,819

Photo by Keystone

British Reinforcements Arriving at Kingstown, Ireland



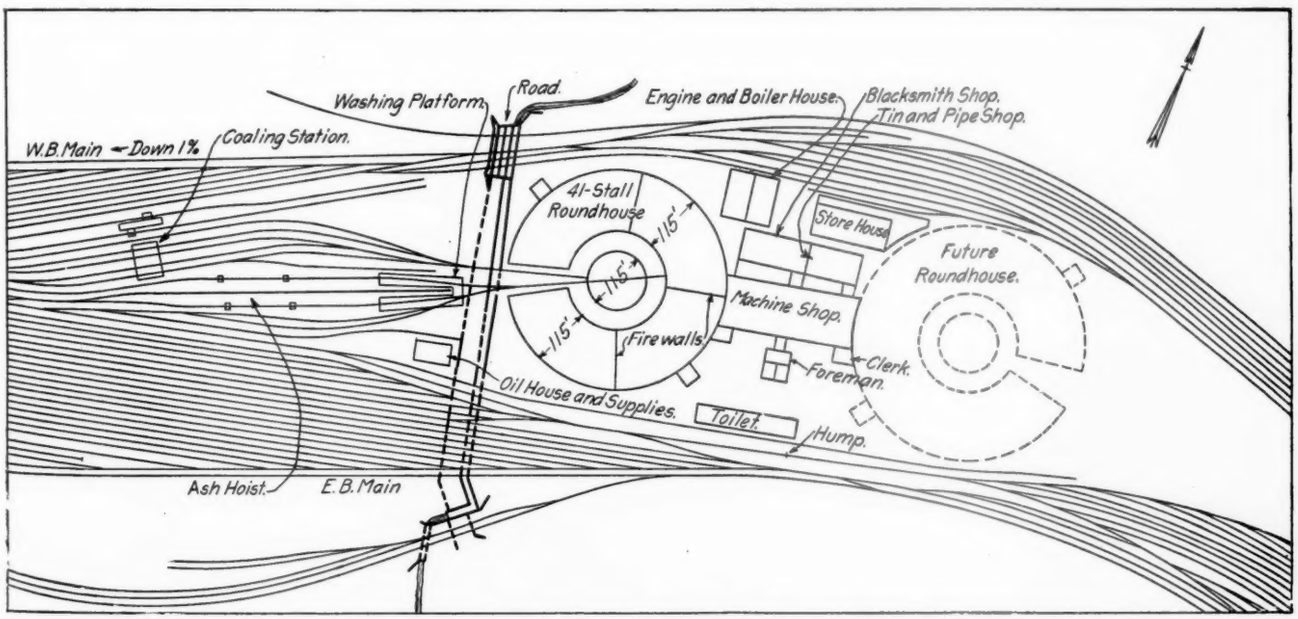
The Enginehouse and Machine Shop Layout

Improving Terminals for Mallet Operation

Facilities for Norfolk & Western at Roanoke, Va., Form Part of Progressive Development Plan

As a step in the provision of more adequate terminal facilities, the Norfolk & Western has recently completed and put into operation three 115-ft. enginehouses with complementary buildings. These structures are of modern type and construction and are designed primarily for the housing and care of Mallet locomotives. The completion of the enginehouses is another step farther in a long term program of development of yard and terminal facilities which was started previous to government control, carried forward to some degree during that period and since continued progressively at Roanoke, Va., Bristol, Tenn., and Shenandoah, Va. The work at the latter two places is practically completed in its final form. The work at Roanoke is, however, completed only up to and including the fourth step of what might be termed a six-step program. The improvements at the latter location are by far the most comprehensive in their scope and because of that fact as well as the engineering and operating conditions created by the geographical location of the terminal and yard, they form the most interesting of the three developments.

The new structures have been built about two-thirds of a mile west of the existing engine facilities. This location has made necessary a re-arrangement of the main and yard tracks at this point which will be carried out even more extensively as the plan approaches completion. When completed the new facilities will include two modern monitor-type enginehouses with 115-ft. turntables and stall lengths of 115 ft. and 130 ft., respectively. The buildings will be equipped with overhead traveling cranes, wheel pits and other necessary modern equipment for the efficient conduct



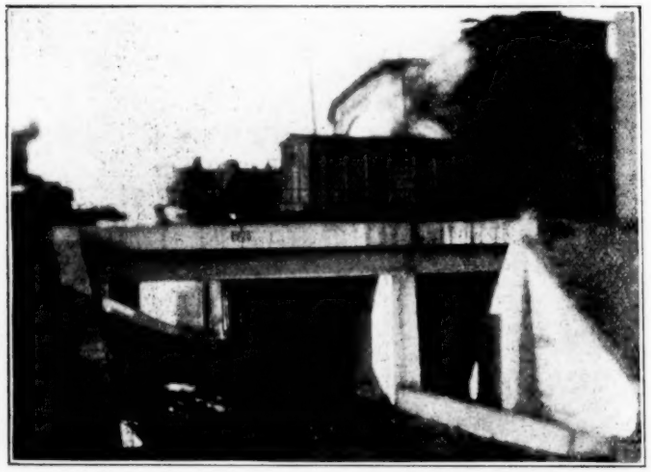
Layout of the New Engine Terminal at Schaefer's Crossing

of roundhouse operation. A large machine shop will connect the two enginehouses, while the enginehouses and machine shop as a unit will be flanked by supporting structures, such as a power plant, wheel, forge and tool shops, offices, oil storage, lavatories and locker rooms, etc. Coal is supplied by means of a 1,200-ton Roberts & Schaefer coaling plant, now in full operation.

The yard work, of which little has been done so far, will consist of some re-arrangement of the present tracks, but chiefly of the extension of practically all of the existing yards in order to provide a minimum capacity of 100 cars per track. The old engine facilities at West Roanoke will be abandoned and the area so obtained utilized in the extension of the yards. The four steps so far completed, or about to be completed, include the construction of the coaling plant, the enginehouse, a 2,000,000-gal. water storage reservoir, a pump house, a water treating plant and parts of the supporting structures necessary to meet immediate needs. The fifth and sixth steps will consist of the completion of the second enginehouse and the remaining portions of the other buildings and shops and the extension of the yard tracks along with the necessary re-arrangement of the tracks caused by the elimination of the old enginehouses.

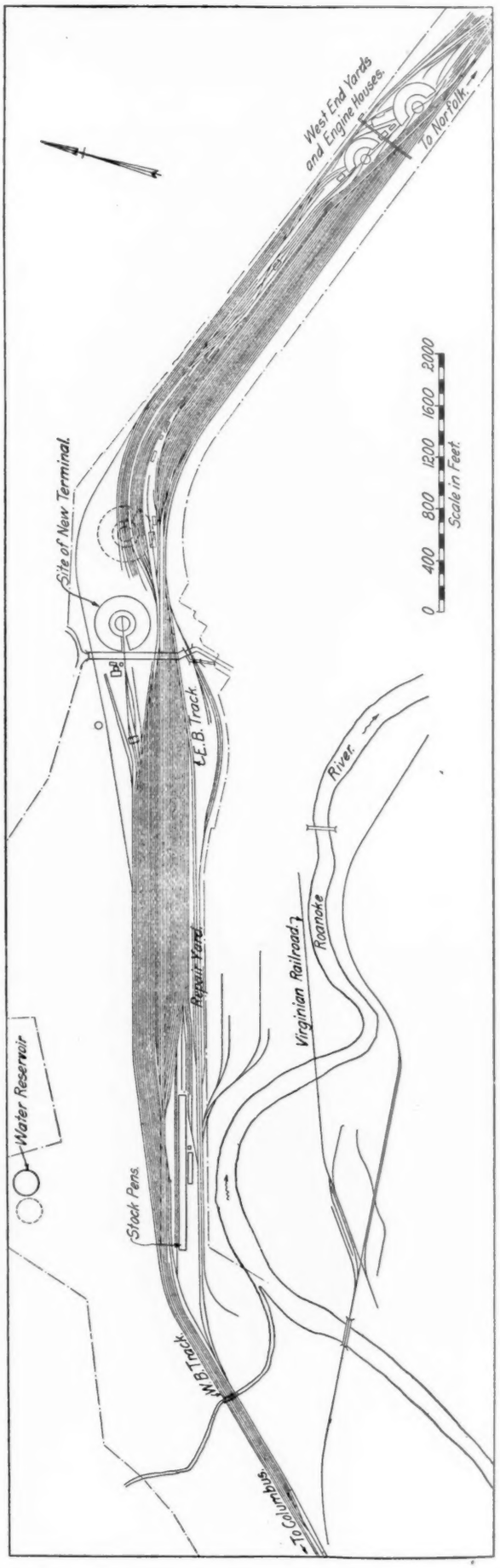
The Trend of the Yard Development

The Norfolk & Western, in passing through the city of Roanoke, follows the line of a valley located between surrounding low-lying hills upon which the city proper is built.



The Concrete Viaduct Over Schaefer's Crossing

From a point about two miles west of the passenger station and continuing west, the right of way practically parallels the low hills on one side and the Roanoke river on the other. In the earlier days, the yard developments, such as there were, were to the east and to the west of Jefferson street, one of the main thoroughfares of the city adjoining the passenger station. With subsequent increased traffic, additional yard and terminal facilities were made chiefly to the west of the station, the other facilities being used for car and locomotive shops. This development, however, was more of an end-to-end increase because of the limiting conditions imposed by the growth of the city on both sides of the railway's right of way and, to some extent, by the topographical conditions. This resulted in making the west end yards a string of small yards with capacities ranging from 340 cars up to 1,215 cars, which extended over a length of approximately five miles. The two enginehouses remaining from the older development work have been kept in operation and will probably be retained for this purpose until the completion of the second new house. These houses have respectively 23 stalls, 100 ft. in length and 20 stalls, 71 ft. in length.



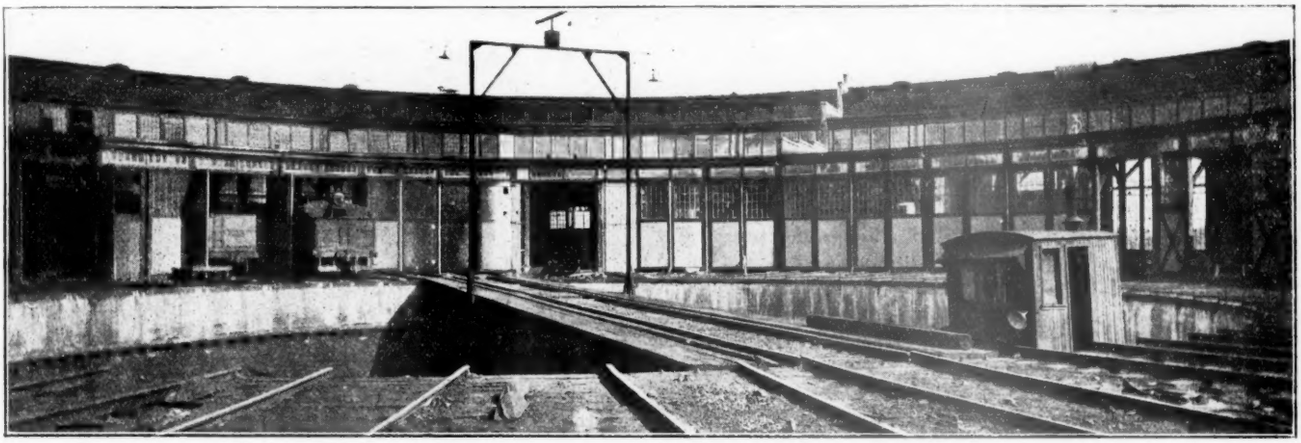
The West End Yards of the Norfolk & Western at Roanoke, Va.

The city of Roanoke forms the receiving and dispatching center for five operating districts. These include the lines to and from Norfolk, Va., Hagerstown, Md., Winston-Salem, N. C., Bristol, Tenn., and Bluefield, W. Va. The double track main line extends from Columbus, Ohio, on the west through Bluefield and Roanoke to Norfolk or more strictly speaking to Lamberts Point, the deep water terminal of the Norfolk & Western. The traffic to and from Bristol and Bluefield is considered as a "west" movement, the remaining districts being classified as north, east and south movements. Thus, Roanoke actually forms the neck of a bottle and during normal freight hauling periods, a passenger or freight train is received or dispatched on an average of about every eight to nine minutes during the 24 hours. The engine turnover is approximately 180 locomotives a day, of which about 60 per cent are Mallets.

The movement from west to east is chiefly coal from the fields west of Bluefield, a majority of the trains entering Roanoke being routed directly to Lamberts Point in solid trains that require little or no change in their make-up while in the Roanoke yards. The trains are received and dispatched from a receiving yard now containing 11 tracks with a capacity of 840 cars. Miscellaneous coal, merchandise and time freight form the balance of the traffic from Bluefield and other points west on the main line. This is received in a four-track yard from which it is humped into a centrally-located yard having 19 tracks of 1,215 cars capacity. The movement through the yard from west to east follows the so-called south half of the yard. Freight from Bristol consists chiefly of lumber, merchandise and live stock, while the freight from the north, i. e., from Hagerstown, consists very largely of merchandise consigned to Bristol and other points farther south and to the west. Other freight from the north comes via water to Lamberts Point and moves chiefly west through Roanoke, although there is a small southern distribution. Freight from Winston-Salem generally moves west. In spite of the large westward merchandise movement, a large proportion of the total westward movement is empty coal cars. Each of these movements, merchandise, empty coal cars, etc., is received and handled through the Roanoke yards and with a few exceptions the movement is continuously in the direction that these cars are to go.

Broadly speaking, the yards are divided into north and south sections, that is westbound traffic both on the main line and in its movement through the yards follows the more northerly tracks. In this way back-up movements are eliminated as far as possible and with the proposed extension it will not be necessary to break trains. In addition, the location of the new engine facilities, plus the more modern and increased equipment there, will permit better housing and care of the locomotives as well as a probable decrease in the time required for their turnover.

The complete rehabilitation plans for this work will eliminate the two old enginehouses, as stated, as well as their



Showing the Interesting Construction of the Inner Circle

A String of Mallet Locomotives at the Old Terminal

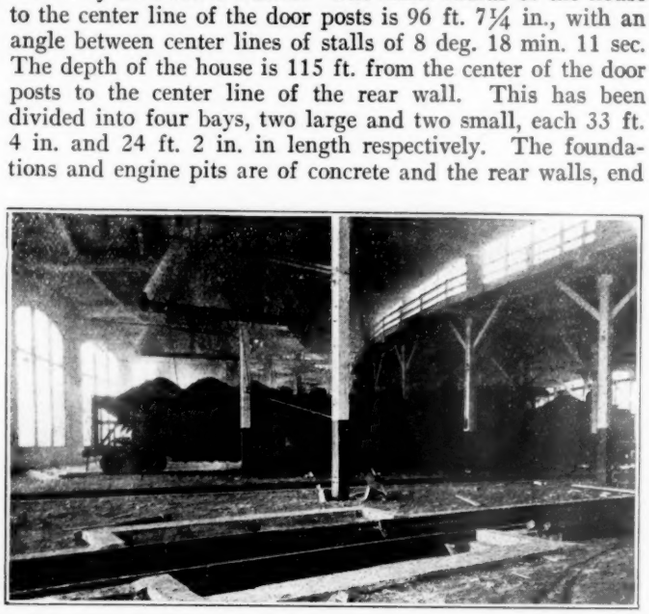
supporting buildings, such as power plants, machine shop, coaling station, etc. By means of this elimination of the old structures and the extension and re-arrangement of the present yard tracks so as to hold 100 cars each, it will be possible to secure approximately 40 to 50 per cent increase in the capacity of the yards. This will be done without any appreciable over-running of its present limits except at the extreme west end where the increased length of tracks will be secured by necessary extensions of the area now used for that purpose.

The Re-arrangement of the Yard Tracks

Practically the only re-arrangement of trackage that has been completed so far is the relocation of the westbound main. This originally was situated at the extreme north of the yard, but as the right of way at the site of the new enginehouse facilities turned slightly to the west, it passed almost directly through the center of the proposed 115 ft. enginehouse. In conformity with the final program, this main track was therefore re-located still farther to the north, and cut into the old westbound main at points some distance to the east and west. This change, accompanied by other minor changes in trackage, opened up an area upon which the first house could be constructed. However, before the second house can be built, it will also be necessary to relocate the ends of those yards now terminating in ladders opposite the east side of the first enginehouse. These will be swung to the north so that both the yard tracks for westbound movements as well as the westbound main will pass around and to the north of the completed engine terminal facilities. These changes, as well as the construction of the leads to the enginehouse, have made it necessary to build a new four-track reinforced concrete viaduct and to widen another, both of which span a highway known as Schaefer's Crossing. This is in addition to a 15-track overhead crossing in use before the terminal improvements were begun. A creek crossing the right of way at approximately this point has been led across under the tracks by means of an open concrete duct paralleling the roadway.

The Enginehouse for Mallet Locomotives

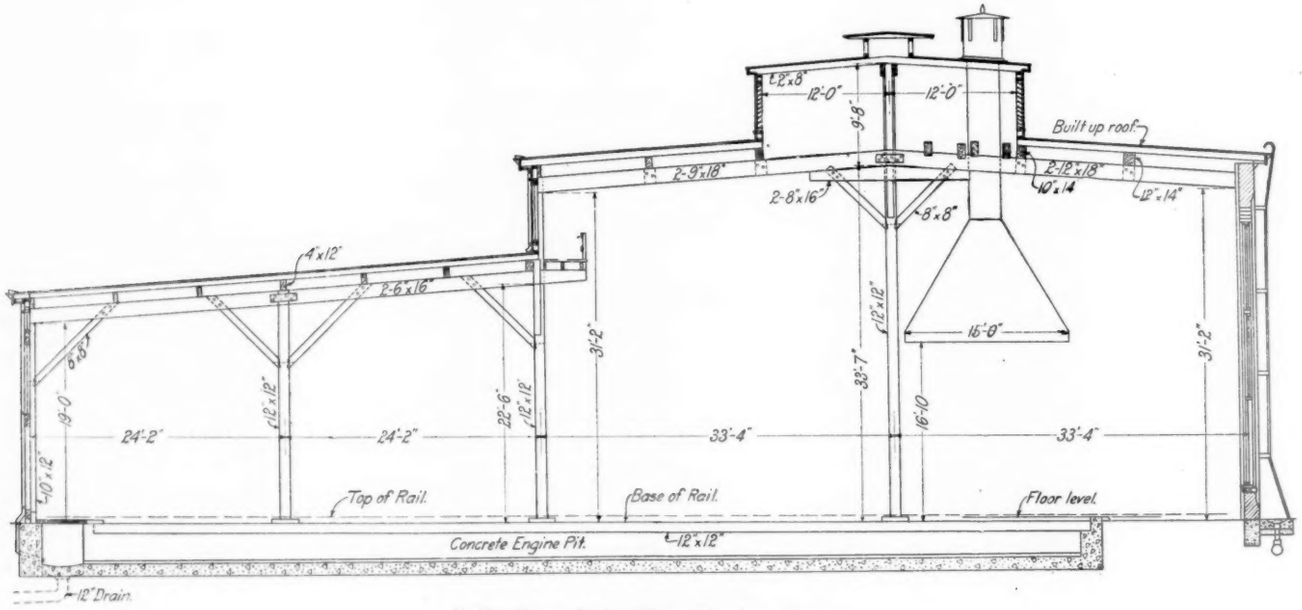
The enginehouse now practically completed is a typical circular structure with 40 stalls, served by two lead tracks from the west, and a 115-ft. deck plate girder turntable driven by an electric tractor. The inner radius of the house to the center line of the door posts is 96 ft. 7¼ in., with an angle between center lines of stalls of 8 deg. 18 min. 11 sec. The depth of the house is 115 ft. from the center of the door posts to the center line of the rear wall. This has been divided into four bays, two large and two small, each 33 ft. 4 in. and 24 ft. 2 in. in length respectively. The foundations and engine pits are of concrete and the rear walls, end



The Efficiency of the Lighting and Ventilation Is Clearly Illustrated. The Locomotive in the Foreground Is Exhausting Dense Clouds of Smoke

walls and fire walls of brick. The roof is of timber overlaid with tar and gravel roofing.

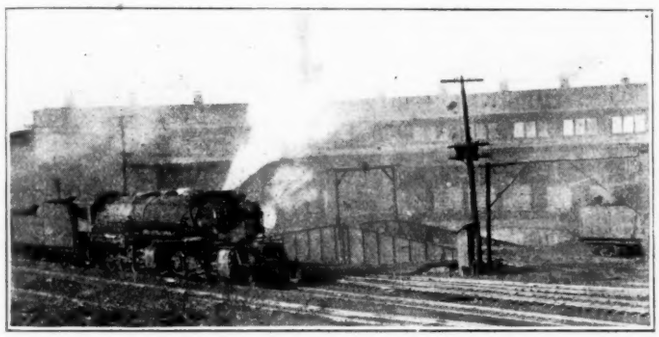
One of the most noticeable features of the structure is the ample provision for light and ventilation. For this purpose a modern monitor-type roof design was adopted which might in a way be called a double monitor. In this design the rear walls have been carried up to give a clear height of 31 ft. 2 in. above the base of rail, corresponding with an equal clearance at the opposite side of the monitor section. The remaining section, consisting of the two 24-ft. 2-in. bays, has a typical shed roof sloping toward the turntable. The overhead clearances of this section are 19 ft. and 22 ft. 6 in. respectively. The monitor section covers the two 34 ft. 4 in. bay sections mentioned and in all but 12 stalls is carried on



A Section of the New Engine House

9-in. by 18-in., and 12-in. by 18-in. rafters supported on the outer walls and two circumferential lines of 12-in. by 12-in. posts. The second or super monitor is also carried by this construction and extends 12 ft. each way from the center post of the monitor section, making it 24 ft. wide over all and giving a total clearance at the center post of 43 ft. 3 in. This second monitor also carries a continuous ventilator with clear openings on two sides 1 ft. 4 in. in height. The main ventilation is provided, however, by means of the smaller monitor which has opposed openings 5 ft. high fitted with louvers.

Additional ventilation as well as light is obtained by a row of pivoted sash running around the entire inner circle of the monitor section and by pivoted sections in the sash



One of Old West End Enginehouses

windows, forming a part of the rear walls. With a distance of 30 ft. 7⅝ in. from center to center of pilasters and a clearance of 31 ft. 2 in., ample opportunity is afforded for a large light area. This has been accomplished through the construction of extra large sash windows covering almost the entire available space. The total width of each installation, consisting of three sections, is 21 ft. 10½ in. with minimum and maximum heights of windows of 22 ft. 6 in. and 24 ft. 11 in. respectively. The entrance doors, with clear openings of 13 ft. 11⅞ in. and clearances of 17 ft. 7 in. above the base of rail, have been built to correspond with the general lighting plan. Each half of the door contains 20 panels of glass, 11 in. by 18 in. in size, while two smaller sections of sash, consisting of six panels, each of the same size glass, have been installed in the walls just over the doors.

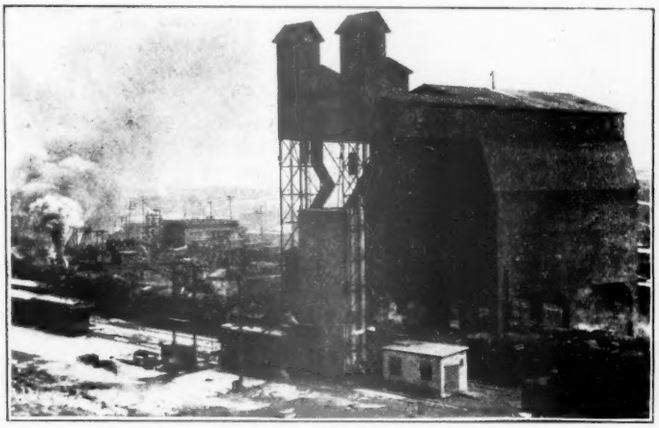
The locomotive exhaust gases are carried off by means of 4-ft. by 15-ft. asbestos smoke jacks, this size being used in all of the stalls except the 12 stalls mentioned in reference to the change in roof structure. In these stalls large 12-ft. by 15-ft. smoke jacks have been installed since it was necessary to raise them considerably higher than usual. This was necessitated because of the installation of a 10-ton traveling crane.

In order to accommodate this crane, the use of which was decided upon after the structure was under construction, the center posts of the monitor section were removed throughout the 12 stalls and another line set up directly under the outer edge of the secondary monitor. This provided an open bay 43 ft. wide along the center line of the stall and necessitated the use of a truss to support the roof structure. The crane runways were supported on additional posts fastened to the original line of posts under the inner circle of the main monitor section and the new line just mentioned. The clearance at the bottom of the truss was 28 ft. in this case. With the exception of this change in 12 of the 40 stalls, the superstructure is the same throughout, the roofing being of the built-up type mentioned, with tar and gravel roofing, all on a slope of ⅞ in. per ft. All posts are supported on 2-ft. 6-in. square concrete foundations extending from 2 ft. to 6 ft. down into solid earth.

The Foundations Varied to Fit Conditions

Because of the wide irregularities of the earth contours at the site of the building over one half of it is on filled land, requiring up to 20 ft. of filling as a maximum. As a result it was necessary in about 20 stalls to support the walls on heavy 4-ft. by 6-ft. concrete piers placed under each pilaster. These piers in turn support reinforced concrete girders 2 ft. 6 in. in depth and 1 ft. 10 in. thick. The remainder of the house rests on solid concrete foundations carried down to solid earth. The irregular topography also had an effect on the design of the engine pits, the base of the pits on filled-in ground being made 10 ft. wide and reinforced with old rails in contrast to the pits of 8 ft. width used on firm ground. The latter pits were of mass construction. The engine pits, of which there is one for each track in the house, are 95 ft. long with 2-ft. by 5-ft. side walls poured integral with a base 1 ft. 3 in. thick which has been given the customary crown. The track is laid on two longitudinal lines of 12-in. by 12-in. timbers, the tops of which are 4 in. below the general floor level. A complete system of wheel pits following the same general idea regarding reinforcement and bearing area, etc., has been included in 8 of the 40 stalls. This layout consists of four complete sets of engine wheel drop pits, one set of which covers two tracks, two trailer pits for Mallet locomotives and two drop pits for tender trucks. The enginehouse floor consists of 6 in. of limestone rock which is free from mud or clay and which has been sprinkled thoroughly and tamped as placed.

Pit drainage has been secured by giving the base of the pits a slope of 0.5 per cent toward the door end where they empty into a concrete trough 4 ft. wide just inside the enginehouse doors. The major part of the roof drainage is toward the door end of the house and is emptied into the same concrete trough through down spouts. The drainage of the outer roof circle is handled in a similar manner, the trough in this case being on the outside of the building. Both arrangements are connected with a regular tile underground drain system.



A Modern, Large Capacity Coaling Plant Rounds Out the Necessary Facilities

The Second Enginehouse and Supporting Buildings

The second enginehouse, when completed, will be located 685 ft. center to center of turntables and to the east. It will also have 40 stalls constructed similarly to the first house except that their length will be 130 ft. As already stated, these two buildings will be connected into a unit by a machine shop 100 ft. wide and 250 ft. long, the center line of

which will correspond to the center line connecting the turntables. A standard gage track will be laid along this line, thus forming an extension to the stall tracks at each end. The shops will be equipped to handle all ordinary running repairs and, for the purpose of facilitating this work, a complete 5,000-lb. monorail crane system will be installed.

In cross-section, the machine shop is of the monitor type with three bays of approximately equal widths. The clearance of the side bays is 21 ft. and of the central bay 26 ft. 5⅜ in. The side walls are of brick carried on concrete foundations, a form of construction similar to that of the enginehouse and one that is used practically throughout all of the buildings. The roof structure, however, is entirely different, being steel trusses supported on built-up steel posts. The monitor has a rise of 12 ft. ⅝ in. and, for the purpose of light and ventilation, is equipped on each side with two longitudinal rows of steel sash and wire glass windows, the upper row of which is hinged. As the sides of the monitor are inclined inward 60 deg. from the horizontal, it was necessary that the sash of the top row overlap those of the bottom and likewise that the bottom row overlap the extension of the roofing at the base of the monitor in order to prevent the rain from beating in. The roof drainage is not permitted to run down over the sash windows, galvanized iron gutters and down spouts being installed for that purpose. Lighting in the side walls is obtained by double rows of sash windows installed the full length of the building.

The design of the enginehouse layout has made it possible to secure a very compact arrangement of supporting buildings, such as offices, carpenter shop and store house, etc. With the exception of a 35-ft. by 200-ft. toilet and washroom building and a 50-ft. by 60-ft. office building, the remainder of the terminal structures have been located just to the north of the machine shop and between the two enginehouses. The smaller shops, such as carpenter, pipe, forge, etc., will be housed in a 60-ft. by 230-ft. building, connected to the machine shop at the center by a tool room. The other two structures of the unit will consist, when completed, of a 60-ft. by 150-ft. store house and a 94-ft. by 94-ft. engine and boiler house. Heavy concrete pavements or runways will be laid between and connecting all of the structures and a system of tractors and trailers installed to handle the necessary stores and materials.

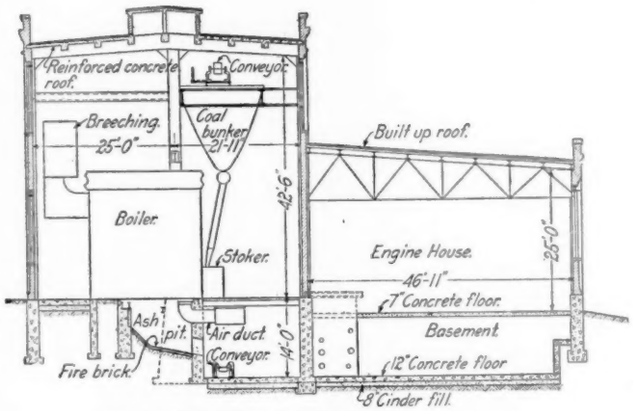
When completed, the store house will have a platform around three sides of the building with a ramp leading down from the platform level to the level of the concrete pavement between the various structures. The interior will be arranged with lines of racks, giving aisles 10 ft. wide over which will be hung trolley beams in order that stores materials may be handled by either traveling trolleys or by the electric trucks and trailers.

The engine and boiler house is of concrete construction practically throughout. The roof structure is supported on steel columns encased in brick while the roof proper has been built up of reinforced concrete roof beams and girders upon which concrete slabs have been laid. The present installation consists of four 300-h.p. boilers and an automatic coal and ash handling conveyor system. Coal, when delivered in cars, is elevated by this conveyor and dropped into parabolic hoppers which in turn feed it automatically to the boilers. Ashes are dropped into concrete pits underneath, where they are picked up by the conveyor and carried around to one end of the building and up to an ash storage bin.

A Large Capacity Water Supply System Installed

The Norfolk & Western has in the past purchased all of its water for both the East Roanoke and west end shops. However, owing to the restricted supply available for its use, it became necessary to furnish its own water at this new terminal. For this purpose a modern pumping unit was installed on the bank of the Roanoke river which supplies water through an 18-in. main to a 2,000,000-gal. reservoir situated on a hilltop adjoining the railway's right of way. This reservoir, which consists of a large circular concrete tank with a baffle wall through the center to aid sedimentation, delivers water through about 3,800 ft. of 18-in. pipe to the new enginehouse, etc. Various piping arrangements have been installed in order that its flow may be directed to either a 100,000-gal. per hour water softening plant or, if so desired, direct to a 200,000-gal. concrete tank and thence to the numerous stand pipes. The flow can also be cut off from the reservoir proper and the water obtained directly from the pumping plant on the river site. The estimated consumption at this point is about 2,000,000 gal. per 24 hours.

The coal handling installation consists of a 1,200-ton reinforced concrete coaling plant of Roberts & Schaefer design, completely equipped with automatic bucket hoists and tram cars, a wet sand storage plant, a sand dryer and a coal crusher and cleaner for stoker coal. This plant serves six tracks, and is so located that a continuous movement of locomotives may be obtained direct from the receiving yards to the coaling plant, ash plant and washing platforms and into the roundhouse. The ash handling facilities consist of five hoists of a type whereby the ashes are dropped direct from the engine into buckets located in pits under the tracks. These buckets are then elevated by means of an inclined track and dumped automatically into open top cars on an adjoining track. Among the other facilities to be completed are an inspection pit serving two tracks and a concrete washing platform also serving a like number of tracks leading direct to the roundhouse.



A Section Through the Power House

The new facilities at Roanoke, Va., as well as those at Bristol and Shenandoah were designed by and erected under the direction of the engineering department of the Norfolk & Western, J. E. Crawford, chief engineer; W. P. Wiltsee, assistant engineer; F. P. Turner, engineer of bridges and buildings, and A. Bruner, assistant engineer in direct charge of the field work. The contractor doing the work was J. P. Pettyjohn & Co., Lynchburg, Va.

A PETITION has been filed with the Interstate Commerce Commission by F. B. Whitney, of Waukegan, Ill., as a railroad stockholder and a citizen of the United States, proposing the consideration by the commission for a plan of railroad consolidations through a limited number of transcontinental systems running in an east and west direction with roads running northerly and southerly as laterals, with particular reference to providing facilities for export and import trade. Mr. Whitney was formerly a member of the transportation committee of the American Manufacturers' Export Association.

Proposes C. P. R. Operate Canadian National

Searching Review of Canadian Crisis—Suggestion That Government Lines Be Handed Over to Canadian Pacific

LORD SHAUGHNESSY, chairman of the Canadian Pacific, has proposed to the Canadian Government that his road operate all of the principal Canadian lines, except the Grand Trunk, and that a contract for that purpose be negotiated. This proposal, as was noticed briefly in the *Railway Age* of April 29, page 1045, was embodied in a letter to Prime Minister Arthur Meighen, in a letter dated April 6, but not made public until April 24.

In the letter, Lord Shaughnessy refers to the fact that he made a similar proposal in 1917 which evidently the government did not care to entertain lest such a monopoly (real or supposed) would be rejected by the country. Now, however, the situation demands drastic action; for the present burden on the public treasuries amounts to about $200,000 a day. He says that the Canadian Pacific has no concealed purposes in the matter. Indeed, the chairman is not sure that this plan would be approved either by the directors or the shareholders; but something must be done, and the loyal citizen cannot remain silent.

Following is Lord Shaughnessy's proposal, substantially in full:

Since 1917 conditions have substantially changed. Capital expenditures that might have been avoided have been incurred, and the deficits of the weaker lines have increased by leaps and bounds.

It is not my purpose to discuss the railway policy of successive governments, federal and provincial, during the past thirty-five years. In most cases the legislation defining the policy received the approval of the electorate at the polls, and therefore if serious and expensive blunders were made, we should be prepared to pocket our chagrin and foot the bills with equanimity. We have, however, the obligation to try to discover and develop plans that may serve to relieve the Canadian people from some part of the distressing and dangerous financial results now in evidence and which threaten the future.

Canada has now about 40,000 miles of railway lines, of which 37 per cent earn annually their interest charges and give a return on the share capital; 54 per cent fail to earn their working expenses, and 9 per cent earn interest on some of their major securities, but have nothing to apply as dividend on the share capital.

Grand Trunk System

Included in the last mentioned is the Grand Trunk Railway System, which is international in character, owning or controlling important railways in the United States with termini at Chicago, Portland and elsewhere. Serving considerable portions of the Provinces of Ontario and Quebec, the Grand Trunk System enjoys a substantial volume of Canadian traffic; but its international business yields the greater part of its gross revenue. Relieved of the handicap that was imposed by the Grand Trunk Pacific, the parent company should, in normal times, be in a position to pay the annual interest on most of its securities that take precedence of the common stock, but a return on the common stock would appear to be exceedingly remote in any circumstances. This railway system is, however, of national importance, and it would be unfortunate from our Canadian standpoint, if, hampered by the methods and ambitions of previous managements, the company should be kept in a state of embarrassment and should be prevented from carrying out plans for increased efficiency and economy. It would be still more unfortunate if by any process the Grand Trunk should be placed in a position that would have the effect of destroying, either on sentimental grounds or others, the movement through Canada of international traffic to and from its feeders in United States territory.

Even at this advanced stage it would be wise for the Dominion Government to drop all measures looking to the acquisition or control of the Grand Trunk to relieve that company of all obligations in connection with the Grand Trunk Pacific and to grant easy terms covering a period of years, for the repayment of any amounts advanced by the government to the Grand Trunk or secured on the credit of the government in the last two years.

The Transcontinental Line

The National Transcontinental-Grand Trunk Pacific scheme of a line from Moncton to Prince Rupert was a deplorable blunder in its inception and execution. Doubtless the Grand Trunk objected to the line from Cochrane east, and only yielded under pressure, but the eastern and western termini of the line having been once determined, the Government was, I know, guided by the advice and wishes of the Grand Trunk management of that day in fixing the location and standard of construction. It was pointed out that grades of 0.4 per cent and light curvature would make for economical operation, because of the increased weight of the train that could be hauled over the line by a single engine. The theory was all right, but the basic essential was ignored. The traffic was not available and would not be available for a long period of time to furnish loads for these heavy trains, and therefore the advantages could not be utilized unless the practice were pursued of holding traffic until a sufficient amount was accumulated, with the consequent delay and expense and the dissatisfaction of patrons. A railway quite sufficient for any traffic likely to develop for many years could have been built in less than half the time, and at a saving of 50 per cent to 60 per cent in cost, and as business increased and revenue improved, the requisite changes to meet new demands could be carried out, as in the case of the Canadian Pacific.

Recognizing the National Transcontinental portion of the route as a national incubus, the Borden Government soon after coming into power, relieved the Grand Trunk Company from financial responsibility with reference to it, and the burden fell on the country.

Grand Trunk Pacific

The extravagantly constructed Grand Trunk Pacific with its terminal at Prince Rupert, proved a most disappointing enterprise, because over most of the route there was no traffic to yield revenue sufficient to meet the interest charges on its mandatory securities, or, indeed, to cover the cost of maintenance and operation; meantime these interest charges, as well as any operating deficits, had to be met at regularly recurring periods, and the Grand Trunk Company could not have shouldered the burden without incurring financial disaster.

The Dominion Government finally took over the Grand Trunk Pacific; but coupled with it was the decision to acquire the Grand Trunk Railway System as well. Clearly this was a mistake, as all the advantages that would result to the Grand Trunk Pacific and other portions of the Canadian National Railways could have been secured by a traffic agreement.

By its Grand Trunk policy the Government is unnecessarily adding to its burdens, and the Grand Trunk System, as I have stated before, would now and hereafter be a much greater asset to Canada if privately owned and operated than it can possibly be if merged into the National System.

While the transfer of the Grand Trunk Pacific to the Government of Canada, and the consequent relief of the Grand Trunk Railway Company would appear to be a jug-handled transaction, it is not without its justification, because when the Dominion Government was framing its policy with reference to the route and character of the line the objections, and, indeed, dangers of the policy were frequently pointed out to the Government by those who had the requisite knowledge of the country and the technical experience to entitle their opinion and advice to more consideration than they received. The Government cannot escape its share of the blame.

The Canadian Northern

The Canadian Northern System was by over-expansion made a hopeless business proposition. Without wishing to criticise the policy pursued by the company, it is evident that the future of the property was founded on the assumption that the prosperity and expansion which Canada enjoyed for a period of eight or ten years would continue indefinitely, and the mileage of the system was increased year by year until the annual interest charges of the company reached a sum out of all proportion to present or prospective revenue. Had the promoters confined themselves to the territory between Lake Superior and Edmonton, their venture would have been of advantage to the country and profitable to themselves, but their exploits east of Port Arthur and west of Edmonton were untimely and disastrous. It became clear that the company must collapse unless kept alive by very

large grants from the public treasury. For this there could be no justification, and the only other alternatives for the Government were to permit default and liquidation or to take the property over under the terms of the Act of 1914. The Dominion Government, having become a partner in the enterprise by accepting 40 per cent of the share capital at a cost to the country of $57,000,000 in subsidies and guarantees, and being guarantor of the company's securities to a large amount, default and a receivership would have had their disadvantages. While it is probable that in the circumstances the country's interests were best served by the acquisition of the property, the legislation relating to the transaction would have been the subject of less criticism had provision been made for the payment of a very substantial honorarium to the men who had devoted nearly twenty years of their lives to the establishment and development of the enterprise instead of the creation of a tribunal to determine the value of something that in the minds of the large section of the public was valueless.

With the ownership or control of the Intercolonial, National Transcontinental, Canadian Northern and Grand Trunk Pacific lines vested in the Dominion Government, the Canadian people are now the proprietors of about 17,000 of railway, with a capital investment of say $850,000,000, and an annual interest charge of something like $34,000,000. In the annual interest charges nothing is included for the Intercolonial and Prince Edward Island Railways, for these have long been with us as unproductive and expensive property; nor for the National Transcontinental absorbed in the Consolidated Fund.

There is no rolling stock equipment nor are there terminal yards, freight facilities, repair shops or other requirements commensurate with a system of this magnitude, and the cost of providing them will be very great indeed.

Operating Revenues

The operating revenue of the Canadian National Railways, including the Grand Trunk Pacific, for the year 1920, was as follows: From passengers, $23,713,834; from freight, $90,982,832. The train mileage required to earn this money was as follows: Passenger trains, 13,322,587 miles; freight trains, 24,485,286 miles. In the same period, Canadian Pacific earned from passengers $49,125,738, and from carriage of freight, $145,303,399, with passenger train mileage 20,538,038, and freight train mileage 26,-281,627.

The train mileage on the Canadian National System is out of all proportion to the revenue, taking the Canadian Pacific as a standard. Were it possible to effect a reduction in train mileage on the National System to make the ratio of train miles to earnings, the same as that on the Canadian Pacific, the saving in transportation alone would represent upwards of $22,000,000 per annum. This, however, is out of the question, because, while there might be a substantial shrinkage of train mileage without serious public inconvenience, the great mileage of the National System to be served and the limited traffic available prevent a proper relation between traffic and train miles.

The Canadian Pacific handled traffic representing revenue 71 per cent in excess of the Canadian National, with an additional cost of transportation of only 13 per cent. This is accounted for to some extent by the greater expense per train mile for transport on the National System. In this unit of operating expenses there would have been a saving of about $6,500,000 if the Canadian Pacific basis had been reached.

Maintenance Costs

Maintenance of way and structures cost the Canadian National about $43,000,000 for 17,000 miles of railway, or an average of $2,520 per mile. On the same account the Canadian Pacific expended $32,574,000 on 13,402 miles of railway, an average of about $2,430 per mile. Doubtless considerable expense was involved in bringing to a higher standard main lines of the National System that had been permitted to run down, but so large a percentage of the system consists of unimportant branches with light traffic where maintenance charges should be comparatively low that the average for the whole system would appear to be rather excessive. If it be assumed that destroyed and obsolete cars and locomotives were replaced in accordance with the Canadian Pacific practice, the expenditure for maintenance of equipment was not excessive, based on the Canadian Pacific average cost in the same year per locomotive and per car. Taking into account the extent of the System, the traffic and general expense of the Canadian National Railways are not excessive.

If the very large annual deficit resulting from the operation of these lines is to be reduced, it must come either from a substantial increase in revenue from traffic or a shrinkage in the cost of operating.

If immigration and settlement are not restricted by legislation or other conditions, there will in the ordinary course of events be a continuing growth of traffic, but at best this growth is apt to be slow and quite insufficient to make any important impression on the annual results for some years to come.

Meanwhile the Canadian people will be compelled year after year to raise, by taxation, sufficient money to meet the appalling annual deficits, unless by some process the cost of the maintenance and operation of the National Lines can be brought to much lower figures. This, however, would not appear to be practicable, as the National System engaged in competition for traffic with another very strong railway company would be at serious disadvantage unless in train service, equipment and in other respects it offered the public facilities approaching those obtainable on other lines.

Reduction of Rates

I have made no reference to the economies that will result from a revision of the schedule of wages and working conditions, which are on a fictitious basis and must be amended, because concurrent with this will be a reduction in the rates for the carriage of commodities that are essential if the country's basic industries are to be kept alive.

The situation is a serious one and almost hopeless unless some plan can be devised that will promptly and effectively bring to this National Railway System additional financial strength and sustenance.

With but one set of shareholders, the Canadian Pacific Railway Company is really two separate entities. The shareholders have their railways constituting the Canadian system of over 14,000 miles, with lake, river and Pacific coast steamship lines, express and other accessories whose income is included in last year's total of $216,000,000, and the net revenue of $33,000,000. And then they have their other assets that are dealt with in a separate account, consisting of their ownership in railway companies in the United States that are under separate management, but that interchange traffic with the company at the frontier, the ocean steamship lines, lands still owned and payments accruing on lands already sold, mining and other interests, in all representing a substantial sum from which revenue is derived to supplement the distribution to the shareholders from the proceeds of the railway operations.

If by some arrangement with the company these assets could be segregated and the railway property added to the government system that I have just described, the system would comprise 31,000 miles of railway with a considerable amount of parallel linesunimportant or useless.

Price to Be Paid C. P. R.

The consideration to be given the shareholders of the Canadian Pacific in exchange for the properties above defined would, I imagine, be in the nature of an undertaking by the Government of Canada to pay to the shareholders in perpetuity a fixed annual dividend on the share capital, to be supplemented by a further payment when the whole property was yielding a specified return.

The extraneous assets of the Canadian Pacific would be transferred to and administered by trustees or by a subsidiary company with another board of directors, so that the directors of the railway company would be interested only in the administration of the trust placed in their hands by the people of Canada. There would be no motive for selfishness, if such a thing were possible in the circumstances. The income on their shares being fixed and unchangeable, excepting as above provided, the Canadian Pacific shareholders could receive no advantage from preferential treatment given to any particular portion of the railway system. The directorate would have every incentive for wise, prudent and business-like administration.

Of course there are many details that would have to be worked out, but it is not necessary to refer to them here.

C. P. R. a Comprehensive Organization

Now, having brought these properties together, we are faced with the most serious problem of all, namely, that of administration and operation. Political management would be impossible, because among other reasons, policy and management must have the elements of continuity and could not be changed with each change of Government without ruinous results. While I have great regard for the opinion of my friends, Sir Henry Drayton and Sir William Acworth, I do not agree that their plan of management would eliminate the danger of political interference, because it could be changed at any session of Parliament. My suggestion would be that if an agreement with the Canadian Pacific on the lines that I have indicated were found feasible, that company would be used under the terms of a contract approaching perpetuity in its duration to administer and operate the whole property for account of the Canadian people. I mention the Canadian Pacific because the magnitude, scope and variety of its operations compel a comprehensive organization, and this could be supplemented by judicious selections from the staffs of the other companies to meet the demands of the larger work.

Savings to be Effected

On the returns for the year 1920, the gross earnings of the combined system would be $342,283,000, and the operating expenses $345,973,000, a deficit in operation of approximately $3,700,000. The annual fixed charges of the whole system, including the dividend on Canadian Pacific Preference Stock, would be $47,490,000, or a total deficit of about $51,190,000.

Essential expenditures on capital account from time to time will tend to swell these charges, but by the addition of the Canadian Pacific with its ample rolling stock equipment, its splendid terminals and other facilities, in the use of which the whole system would participate, important expenditures which could not be avoided in other circumstances would be rendered unnecessary.

To this amount of $51,190,000 per annum, of course it would be necessary to add the guaranteed dividend on Canadian Pacific common stock hereafter to be determined, but if we set aside an estimated amount for that purpose, the total deficit, including everything, would be approximately $80,000,000. In the light of these figures, present conditions would not be improved, but then we must take into account the saving that would result from the consolidation by the elimination of unnecessary train service and of duplicate work at important terminals and at other points; the restriction of maintenance work on unnecessary duplicate lines; the decrease in general as well as traffic and agency expenditures; the common use of cars and locomotives, reducing to a minimum capital expenditures on that account with greater economy in the maintenance of equipment and the stoppage of outlay in many other directions.

Operating Ratio Should Be 80 Per Cent

In 1920 the operating cost of the combined system was about 101 per cent of the gross earnings. The Canadian Pacific cost was 84.7 per cent of its gross earnings. If the average for the combined system could be brought to the Canadian Pacific level it would represent a saving in the cost of operating of about $56,000,000 per annum. There would still be a deficit of $24,000,000 per annum, but for a number of reasons, 1920 was an expensive year, and I see no reason why the operating raito should not be brought as low as 80 per cent at most, which would reduce the total deficit to eleven or twelve million dollars. To catch up with this a growing volume of traffic would have to be relied upon, but with immigration settlement and development this should come in gradual stages, and the saving to the country in the meantime would be very large.

In connection with these transportation matters there are sure to be miscalculations and disappointments, but the consolidation that I have outlined above would appear to be the most logical and economical policy.

Besides the National Railways, Canada would then have an International group consisting of the Grand Trunk, the Canada Southern, the Toronto, Hamilton & Buffalo, and the Pere Marquette Railways of 4,600 miles, and other lines of local or provincial character. These latter lines may well be left to work out their own salvation, and if they require aid, the provinces, having been relieved of their major liabilities under their guarantees, can well afford to give it.

I am not giving expression to these views as chairman, director or shareholder of the Canadian Pacific Railway Company, and it is quite possible that neither my fellow directors nor the shareholders would be in accord. The Canadian Pacific, with its low capitalization and capacity for securing and handling a vast volume of traffic, should, as time passes, yield a larger return to its owners than at any time in the past. Indeed, about this there is little room for doubt, but with a satisfactory annual dividend guaranteed in perpetuity by the Canadian Government, the shareholders could probably be induced to forego their speculative benefits, as their shares would then have the security and stability of government bonds.

It is my sole purpose to assist if I can in the solution of what is beyond doubt the most serious and menacing problem that faces our country, and to frankly outline the policy that I would adopt and carry into effect if the responsibility were upon me to act as the representative and trustee of the Canadian people in safeguarding the present and future railway transportation interests of the Dominion, and in endeavoring to stop, or at any rate minimize the vast demands on the treasury and the credit of the country that are pretty sure to be made yearly if the present policy is continued.

FOR THE THREE MONTHS ending March 31, 1921, only two out of 1,122 Louisiana & Arkansas passenger trains were late at junction points or terminals. One of the delays was directly chargeable to the Louisiana & Arkansas, while the other was occasioned by the derailment of a freight train of another line on joint track.

Governor's Committee Opposes Rate Raise in New England

THE JOINT COMMITTEE appointed recently by the Governors of the New England States, in a report signed by each of the 31 members of the composite committee published on April 29, declared that the railroad executives had failed to show that the desired general advance of ten per cent in freight rates for a limited time would remedy the situation, or that by such an increase New England interests would not suffer. The committee recommends:

"1. The Federal Government should be asked to give assistance to the railroads in their extremities, not as an act of paternalism but as an act of justice. The obligation of the government to return the railroads in the same condition in which they took them over has not been fulfilled. The period of Federal guarantee should be extended (retroactive to September 1, 1920) and arrangements should be made at once for the payment of the amounts claimed by the railroads to be due them from the government, leaving exact determination to be made afterward. A memorial should be addressed to the President of the United States, pointing out to him the present conditions of the railroads in New England and asking him to take prompt measures to fulfill the obligations of the government.

"2. The prevailing wage scale and the terms of the so-called national agreements have been a large factor leading to the present financial condition of the railroads; and Congress should consider whether the present method of settling labor disputes is entirely adequate, and if not in what respect it may be remedied or altered.

"3. * * * The Interstate Commerce Commission might well avail itself of its authority and make without delay such investigation as may be desirable toward a permanent solution of the railroad difficulties."

To carry out the foregoing recommendations the committee desires to be authorized to present these considerations to the President of the United States, the Railroad Labor Board and the Interstate Commerce Commission, and to take such further action as may be found necessary.

The committee finds the financial condition of the separate roads not the same. The Boston & Albany took no part in the request for advance in rates. The Rutland Railroad in January and February showed a deficit of $121,091 and the committee thinks that it can continue to operate for the present without serious difficulty. The Bangor & Aroostook asked for an increase of rates only on one-half of one per cent of its entire business.

For the six months ended February 28, 1921, deficits after payment of fixed charges have been as follows: Maine Central, $915,359; Central Vermont, $918,652; Boston & Maine, $8,292,846; New York, New Haven & Hartford, $11,212,022.

In its summing up the committee says:

"There is grave doubt in our minds whether the proposed increase would produce the amount of revenue which the railroad executives estimate and which would be really necessary for any effective relief. There is, of course, a point where traffic will not move.

"The idea of New England as a distinct district for rate making purposes has been resisted heretofore by the New England public and ought, in our opinion, to be objected to upon every occasion when it is proposed. It seems to us that neither New England railroad executives nor any other persons in the New England community ought to propose or assent to a scheme of rate making which will so surely react to the disadvantage of New England industry, and likewise of the railroads themselves. In all essential respects there is no New England railroad problem as such. It is a railroad problem for the whole country."

The committee is not convinced that the borrowing ca-

pacity of the railroads has been exhausted. Special stress is laid on the "unfortunate precedent" that would be established if freight rates were advanced in New England, without a full hearing, when not advanced in the rest of the country. The Interstate Commerce Commission has made it a rule not to allow advances without full hearings; and the commission should not be asked to break that rule now. New England mercantile interests surely will make objections and, therefore, there must be delay. At the same time the railroads say they must have relief now if ever; they say they cannot wait. However, the danger of financial ruin, due mainly to the delay in getting decisions from the Labor Board, affects not New England alone, but the railroads of the whole country. The committee undertook to confer with the leaders of the railroad brotherhoods, but those leaders declined to confer. The delays incident to the restoration of conditions by the Federal Government are characterized as a "mockery of fair dealing."

The committee's action on this report was unanimous. The president is George R. Nutter, president of the Boston Chamber of Commerce, and its secretary is Charles A. Andrews, president of the Associated Industries of Massachusetts.

Comments by New Haven Executive

President E. J. Pearson, of the New Haven road, commenting on this report, said:

"The present situation of the New England railroads is developing closely in accordance with the information and forecast which have been furnished to the Federal authorities and to the New England Governors. The public has been receiving transportation from the New Haven system at less than cost. The deficits for the New Haven and Central New England, excluding Federal guarantees, were $8,000,000 in 1918, $8,900,000 in 1919, $30,000,000 in 1920 and $7,675,000 for the three months of January, February and March, 1921; a total for such period of $54,575,000.

"These accruing deficits have compelled reduction of service, the deferring of maintenance, and have resulted in the accumulation of obligations which will compel the continuance of reduced service for a considerable time ahead in order that the amount of deficits which are in excess of Federal guarantees may be liquidated when conditions become more favorable and make such action possible. There are two essential features in the New England railroad problem. The first is common to all roads; the second is that of adequate compensation through divisions for the handling of intertrunk line freight, which comprises about 80 per cent of the traffic in ton miles on the New Haven system. The New Haven has presented the facts in these matters to the proper governmental authorities and is confident they are receiving careful and full consideration."

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight during the week ending April 23 showed a slight increase as compared with the previous week to 704,527. This represents the third consecutive week of increase but the increase as compared with the week before is only 631. For the corresponding week of 1920, which was affected by the switchmen's strike, the loading was 717,772. For 1918 it was 715,042. Increases are shown as compared with the corresponding week of the previous year in the loading of grain and grain products, and merchandise and miscellaneous freight. Increases as compared with last year are also shown in the Eastern, Allegheny and Southwestern districts. As compared with the previous week, however, there was a decrease in grain and grain products, forest products, and merchandise and miscellaneous freight, although there was an increase in livestock, coal, coke and ore. Merchandise and miscellaneous freight has heretofore been increasing practically every week, but this represents the third consecutive week of increase in coal loading after a steady drop from January 1 to about April 1. The summary as reported by the Car Service Division of the American Railway Association is shown in table above.

Owing to an increased demand for open top cars for the transportation of coal, a further decrease of 16,412 in the total number of idle freight cars was shown for the week ending April 23. The number of surplus cars was 483,067 as compared with 499,479 for the week of April 15. Surplus coal cars totaled 235,275, which was a decrease of 16,735. A slight increase was reported, however, in the number of idle box cars, which totaled 177,360 or an increase of 555. Compared by districts, decreases in the number of cars for which there was no freight were reported in all except the Northwestern district.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS: COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, APRIL 23, 1921

										Total revenue freight loaded			Received from connections		
Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	5,394	2,769	37,138	797	5,482	873	55,545	64,400	172,298	.....	.....	187,328	.....	.....
	1920	4,346	2,868	44,339	1,595	7,201	2,571	27,937	65,498	.....	156,355	169,471	.....	145,696	188,296
Allegheny	1921	2,481	3,166	42,976	2,377	2,328	826	42,240	46,546	142,940	.....	.....	95,543	.....	.....
	1920	1,661	2,971	43,544	4,894	2,654	5,000	31,676	49,304	.....	141,704	140,308	.....	73,844	103,694
Pocahontas	1921	99	92	17,643	32	1,274	17	2,555	6,469	28,181	.....	.....	12,797	.....	.....
	1920	89	115	18,396	657	1,618	251	150	8,493	.....	29,769	33,893	.....	12,445	18,049
Southern	1921	2,831	2,073	19,105	565	12,936	805	37,971	36,702	112,988	.....	.....	62,281	.....	.....
	1920	2,621	2,401	21,062	140	17,144	2,636	33,788	43,655	.....	123,447	112,057	.....	71,559	57,823
Northwestern	1921	8,407	7,246	3,296	529	14,062	1,888	26,744	28,756	90,928	.....	.....	40,179	.....	.....
	1920	7,774	7,969	7,130	841	20,498	7,773	20,024	37,992	.....	110,001	103,129	.....	43,690	46,259
Central Western	1921	9,029	11,844	14,205	155	4,378	737	30,191	29,369	99,908	.....	.....	44,979	.....	.....
	1920	6,439	12,678	16,244	395	4,777	2,586	19,423	38,279	.....	100,821	100,257	.....	40,653	64,673
Southwestern	1921	4,574	2,412	4,213	140	6,251	545	16,381	22,768	57,284	.....	.....	42,933	.....	.....
	1920	3,335	2,655	5,050	162	6,180	440	14,989	22,864	.....	55,675	55,927	.....	39,071	43,197
Total, all roads	1921	32,715	29,602	138,576	4,595	46,711	5,691	211,627	235,010	704,527	.....	.....	486,040	.....	.....
	1920	26,265	31,657	153,765	8,684	60,072	21,257	147,987	266,085	.....	717,772	.....	.....	426,958	.....
	1919	38,857	30,320	139,294	.....	55,164	25,232	.....	426,175	.....	.....	715,042	.....	.....	521,991
Increase compared	1920	6,450	.....	.....	.....	.....	.....	63,640	.....	.....	.....	.....	59,082	.....	.....
Decrease compared	1920	.....	2,055	17,189	4,089	13,361	15,566	.....	31,075	13,245	.....	.....	.....	.....	.....
Increase compared	1919	.....	.....	.....	4,595	.....	.....	211,627	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1919	6,142	718	718	.....	8,453	19,541	.....	191,165	10,515	.....	.....	35,951	.....	.....

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

April 16	1921	33,367	26,530	135,658	4,365	47,909	4,941	214,082	237,044	703,896	601,695	706,012	472,107	317,933	525,277
April 9	1921	33,415	25,339	128,044	4,835	47,806	4,787	212,142	237,351	693,719	801,559	711,282	466,513	560,040	530,396
April 2	1921	33,354	23,584	109,284	4,862	46,911	5,508	211,244	231,895	666,642	858,827	688,567	459,161	669,872	518,098
March 26	1921	32,960	24,339	122,189	5,179	49,516	6,480	211,028	236,161	687,852	900,386	713,275	479,635	696,447	557,736

Designing Large Locomotives for Maximum Utility*

Power Should Not Be Dwarfed by Physical Limitations of the Road—Co-operation Needed for Further Development

By M. H. Haig
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THE DESIGN of a large locomotive depends on the service to which it is to be assigned. The service varies with the weight of the train to be hauled and the number of cars in the train, and is affected by the topography of territory on which it is to operate, ruling grades in each direction, length of grades, average speed between terminals, method of dispatching, whether single or double track between terminals, etc. This information being available, it is a reasonably simple matter to determine upon the leading features of a locomotive to meet the requirements.

Restrictions and Limitations Imposed

For a locomotive to give practically 100 per cent service, its design and construction must not be restricted by personal opinion or by physical limitations of the road. If the weight needed for adhesion in starting a given train is restricted by an opinion that certain wheel loads should not be exceeded or because bridges and track are not capable of carrying the necessary weight, then the capacity of the locomotive is restricted and the train must be adjusted to the locomotive, instead of the locomotive being built to suit the train. This in turn has a tendency to limit a division or a railroad as a whole. Limitations such as these, together with clearances of bridges and structures, obstructions along the right of way, etc., affect the locomotive design and construction. The locomotive as a whole is dwarfed, or some of its vital or essential parts are so dwarfed as to cripple the machine as a whole.

A railroad is a plant, establishment or organization for manufacturing transportation. The locomotive is a very important part of the plant and is one of the most direct earners of revenue from which the transportation-manufacturing plant obtains its income. As such, it is a matter of business and economical principle to adjust some of the physical conditions of the road to meet the requirements of the locomotive, to prevent dwarfing it and to prevent sacrificing its power. Meeting these requirements of the locomotive amounts to meeting the necessary requirements of traffic. No turntable installed at a principal roundhouse should be less than 100 ft. long, and in many cases the length should be 125 ft. The distance between the walls of a modern roundhouse should be great enough to permit closing the door behind the tender of a Santa Fe or Mikado type locomotive and have ample room for trucking between the locomotive pilot and the outer wall of the roundhouse. Passing tracks should be long enough to take trains justified by the business and traffic of the division or territory. Bridges, rail and roadbed should be capable of carrying a static wheel load of at least 65,000 lb. per pair and of permitting the additional stresses resulting from a freight speed of at least 45 miles per hour. In meeting the requirements of rail stresses particular attention should be given to the employment of heavy rails on curves.

Unless these physical conditions are provided, a locomotive cannot be designed and constructed without restriction and proper power cannot be furnished to meet requirements. The only governing factors should be the size of train and the traffic of the territory.

Leading features of locomotive construction such as relative size of cylinders, length of stroke, total heating surface, superheating surface, grate area, etc., have been well covered by handbooks and pamphlets issued by locomotive builders and by reports to the various associations, as well as by articles in the technical press. Tables of principal dimensions of large locomotives are obtainable from the same sources, together with detailed descriptions of features of design and construction which have met with general favor and some which have been short-lived. A discussion or comment on these features would therefore be largely a repetition of facts already presented and easily available.

Leading Features of Locomotive Construction

Features which have not been so generally discussed and exploited are those which keep a locomotive in service a maximum length of time, reduce engine failures to a minimum, reduce cost of maintenance and repairs, and increase revenue-earning power. Among these, durability of material and accessibility of parts are important factors. The latter implies arrangements by which a locomotive is made free from complications in construction, inexpensive to repair, easy to maintain, and so put together that needed repairs can be made handily and quickly.

Almost as important as providing a locomotive that will meet the requirements of trains to be hauled and traffic conditions, is providing one that requires minimum repairs—a locomotive that after one trip is ready to be turned for the next trip.

A locomotive is in revenue-earning service only when it is hauling trains. Any road can make a study and determine what proportion of its locomotives are unserviceable and what percentage of the time its serviceable locomotives are on the road. Such information will show what percentage of the time its engines are earning revenue.

To maintain the advantages of designs already existing and to develop these still further requires the unlimited co-operation not only of the mechanical, civil engineering and operating forces of the railroads, but also of the locomotive builders, and particularly of the manufacturers of material. The necessity for unlimited co-operation by manufacturers of material is evident from the study of failures of parts both large and small.

Mr. Haig discussed in detail problems in the design of important parts of the locomotive, including counterbalancing crosshead and crosshead pins, piston rods, cylinders, driving wheels, frame braces, boiler braces, tube sheets, ash pans, brake rigging, water columns and cab equipment, concluding with the following discussion of the advantages of high capacity tenders.

Tender Capacity

Tender capacity should be arranged so as to reduce to a minimum the time a locomotive is detained from the productive work of hauling trains for the purpose of taking water and fuel. This implies large fuel and water capacities, but in arranging for suitable tender capacity care must be taken to avoid unnecessary weight, as any increase in the weight of the tender produces an equal decrease in the weight of train that can be hauled behind the tender.

Tender fuel space should be arranged so as to enable the

*Abstract of a paper to be presented at the railroad session of the spring meeting of the American Society of Mechanical Engineers, Chicago, May 26, 1921.

locomotive to handle a full train with as few stops for fuel as may be feasible.

On territories equipped for water to be taken on the run or when stops for purposes other than taking fuel or water are made regularly at stations where water may be taken, the water capacity should be only sufficient to supply the locomotive when handling a full train, between water stations.

On territories handling a large percentage of through trains with few stops, tenders of large capacity are desirable as they permit keeping locomotives more continuously at work.

In addition to reducing time consumed by trains on the road, together with overtime pay to train and engine crews, large-capacity tenders effect a substantial saving by reducing the fuel consumed in starting and accelerating trains as well as the damage to locomotive machinery, draft rigging, tires and rail which frequently results from stopping and starting long freight trains. Train dispatching is simplified and the movements of superior and opposing trains is expedited, as a train which keeps moving interferes less with the movements of other trains.

Railroad Hearings Before Senate Committee

WASHINGTON, D. C.

HEARINGS BEFORE the Senate committee on interstate commerce, which has been directed by a Senate resolution to make a general inquiry into the railroad situation with particular reference to the increases in expenses and what should be done to reduce the cost of transportation, will begin on Tuesday, May 10, with representatives of the railroad executives as the first witnesses. Among those expected to testify are Thomas De Witt Cuyler, chairman, and Alfred P. Thom, vice-chairman and general counsel, of the Association of Railway Executives; Daniel Willard, president of the Baltimore & Ohio, and Julius Kruttschnitt, chairman of the Southern Pacific. The railroads have made extensive statistical preparations for the hearing and other witnesses will be called later. The hearings are expected to run for several weeks and may last well into the summer. The railroad testimony will probably consist largely of a demonstration of the effect of the war and of federal control upon their operations, in order to show why repeated rate increases have failed to offset the increases in wages and other items of operating expenses. S. Davies Warfield is expected also to present his plan for a reorganization of the railroads and labor leaders and shippers will be heard from.

Senator Cummins, in a newspaper interview, expressed a hopeful view of the prospects for a readjustment of the railroad situation.

"The railroads," Senator Cummins said, "are in no different situation from the other industries of the country. Like many other producing industries they are confronted with a sudden and violent shrinkage of business which helps to make the selling price of what is produced lower than the cost of production. They will have to solve the problem in the same way as other producers are trying to solve it; by the bringing of the cost of materials and the cost of labor into line with the proceeds of what they have to sell.

"To assume the contrary would be to assume that a national transportation system cannot be self-supporting in this country. If that were so, there would be nothing to do but for the government to take it over and pay the annual deficit, however heavy, out of the Treasury. The country must have its transportation system.

"But there is no reason to imagine anything of the kind. There will be a very large saving in cost of materials. Coal will be lower this year, ties are lower, steel and iron material is lower except rails, and rails will also have to come down. The question of the wage scale is in the hands of the Labor Board.

"When railways were placed in receiverships and their mortgages foreclosed in the past, there were two motives for such procedure—to get rid of an incapable management or to reorganize and recapitalize the roads. At present the latter motive, at least, does not exist. Foreclosure would not help the bondholders. The circumstances give reasonable assurance of adequate net revenue in due course to meet all interest, due or overdue. What reason is there, then, that in such a case the bondholders should not consent to forego their interest temporarily until the readjustment of cost to revenues shall have been effected?"

President Harding and his cabinet appear to have dropped for the time being their efforts to find a quick solution of the railroad problem, having come to the conclusion that time will be required to work it out and that the subject is one which does not lend itself to executive interference in view of the fact that jurisdiction over the most important phases of the problem has been vested by law in the Interstate Commerce Commission and the Railroad Labor Board and that rate-making is a legislative function. For the first time in several weeks the railroads were not discussed at the cabinet meeting on Tuesday and in his last two conferences with the newspaper correspondents the President has had very little to say on the subject except to point out that the matter is largely in the hands of the Interstate Commerce Commission and the Labor Board and to indicate his pleasure at news that the railroads had voluntarily agreed to some readjustments of rates. The President hopes that the hearings before Senator Cummins' committee may suggest some form of improvement in the governmental machinery for dealing with transportation questions, if the investigation shall develop the need for any change, but while he is anxious to see rates reduced he has apparently been convinced that nothing can be accomplished by efforts on his part to hurry matters unduly.

The President made it clear when he first took up the problem that he did not believe in going over the heads of the commission or the board, but it is thought that he may have made suggestions to both of them calculated to stimulate their handling of the questions involved and that some of the results may be seen in the fact that the Labor Board handed down its decision on the National Agreements sooner than was expected, and that it is apparently handling the wage reduction case in a somewhat more expeditious fashion than it did the National Agreement case. The Interstate Commerce Commission has been active in working with the railroads and shippers on rate readjustments, and it is understood that more has been accomplished than has been given publicity, but the commission has taken a firm stand against the idea that the situation could be improved by rate reductions regardless of the cost of operation. It is understood that the railroad question was brought up at one of the cabinet meetings in March by Vice-President Coolidge in connection with the serious condition of the New England lines, and that it was first approached as a question of what should be done to avoid wholesale railroad bankruptcies. The propaganda to the effect that high freight rates were stifling business and that the railroads would do better if rates were reduced, at least on some commodities, was then brought forward and was fostered in the President's mind by delegations of farmers and shippers of coal, building materials and other commodities that the public has been slow to buy at the prices asked or at prices satisfactory to the producers. The same view has been presented by many members of Congress who have been receiving complaints from their constituents. The President, however, made up his mind to obtain information from all sides of the question.

Employees Begin Fight on Wage Reductions

Labor Board Hears Defense of Present Rates of Pay—Unions Vigorously Oppose Reductions

RAILWAY LABOR'S DEFENSE of the justness and reasonableness of the rates of pay established by the Railroad Labor Board last July, will be based largely on (1) the fact that there have been no decreases in the wages of the workers in the coal and steel industries up to the present time; (2) the reiteration of the hackneyed charges regarding the "inefficiencies and inadequacies of management" and (3) a flat denial that the decreases in the cost of living justify wage reductions at this time. This was clearly indicated in statements made before the Board by various labor leaders on April 28, when hearings in the controversy over wages were resumed.

The presentation on behalf of the railroads in this controversy was described in the *Railway Age* of April 22, (page 988). After a recess of one week, the employees presentation was opened by B. M. Jewell, spokesman for the labor organizations, who said:

> The Board can make no reduction in railroad wage rates at this time because there have been no reductions in wages paid in the basic industries comparable to the transportation industry, and because there has not been a sufficient reduction in the cost of living to justify a reduction in wage schedules that were inadequate to meet living costs at the time they were established. Coal mining and the steel industries are the only basic industries that may be compared to the railroad industry, and it is well known that there have been no wage cuts for the miners or for the steel workers.
>
> In addition to the facts which bear directly upon the principles which have been set up as a guide for the Board in wage determinations, there are also other and more fundamental conditions of which the Board must take judicial notice.

He then reiterated the spectacular but fallacious charges of mismanagement which have been used as a smoke screen in this and in the national agreements controversy, drawing from these charges the conclusions that "the Board cannot entertain a plea from the railroad managers for a reduction in wages under any circumstances until the inadequacies of management and the high operating costs resulting therefrom have been eliminated" and that "this Board should not consider any complaints relative to the rates of pay of railway employees until it is satisfied that the railroads are not being forced to purchase their fuel, equipment, oil, timber and other supplies at exorbitant prices."

Mr. Jewell continued:

> We shall hold and we shall submit data and argument to show that no action looking towards a reduction in wages can now be taken by the Board which can be predicated upon any sound basis. No justification can be found in ethics, in economic reason, or in the cold, concrete facts of present-day industrial life and activity, to support the Board in making any changes in the existing rates of pay to railroad employees.
>
> For 18 months preceding Decision No. 2 of this Board, when living costs were steadily and rapidly rising, railroad employees sold their Liberty Bonds at a sacrifice, went into debt, deprived themselves of even the necessaries of life, and waited for some measure of relief. If the cost of living should decline in the future as rapidly as it did from June to December, 1920, it would be three years before railroad employees, with the increased purchasing power arising from the maintenance of existing rates of pay, would be able to recoup the losses which they sustained during the war period by the failure of their earnings to keep pace during that time with the increased cost of living.
>
> In the first place, the cost of living has not declined since the wage decision of this Board which was manifestly based on the official returns not for June, 1920, but for December, 1919. Any reduction in food prices since the first of the year have been practically neutralized by increases in house rents and fuel. Furthermore, an examination of official figures for past years, even for the war period itself, show that there has always been a downward fluctuation during the early months of each calendar year followed by a trend upward. Finally, it is the consensus of the best opinion available that the lowest point in the existing depression has been passed, that wholesale prices have practically become stabilized, and that retail prices, or the measure of the workingman's cost of living, will probably advance in the future.
>
> In the second place, the Board has accepted in its last wage award the principle of a living wage for the lowest paid railway employees. In the light of this fact, we feel assured that the Board will not accept the supply and demand theory of wage-fixing which has been urged by the representatives of the railroads as a justification of wage-reductions. We shall show that the Board cannot reduce the rates of pay of unskilled workers without rejecting the principle of the living wage, or impairing the maintenance of an American standard of living by the unskilled groups of employees.
>
> In the third place, we shall not deny that rates of pay have declined in certain outside industries, but we shall show that the facts submitted by the railroads do not afford any justification for a wage-cut in the transportation industry. We shall point out that the comparisons made by the railroads are not in point, that the instances of wage-cuts which they have submitted are not characteristic of basic industries analogous to the transportation industry such as coal-mining or iron and steel making, and finally, we shall claim in this connection that rates of pay which have been arbitrarily imposed upon workers in other industries without regard to principles or standards which public policy has sanctioned should not be cited or accepted as precedents upon which to base action from this Board.
>
> In the fourth place the increases granted to the federated shop craft employees of the railroads have not in any sense kept pace with the rising cost of living computations, which show that the mechanics whom the shop crafts represent have received increases totaling over 100 per cent since 1915, are founded upon the false basis that increases can be shown in terms of hourly rates. The only fair basis of comparison is the average daily earning power of the employee based upon the standard measure of the recognized work day. We shall show with data drawn from authoritative sources that not one of the shop crafts has received increases in daily earnings since 1915 totaling as much as 100 per cent and that the weighted average total increase in daily earnings granted to railroad shop mechanics since 1915 amounts to approximately 83.5 per cent.
>
> Finally, we wish especially to emphasize our contention that there should be no action taken by the Board relative to rates of pay until conferences have been held and new working conditions agreed upon, in accordance with the recent decision of the Board in connection with national agreements. Manifestly there can be no just determination of wages until it is known what the new working conditions or rules will be.

Other Employees' Representatives Testify

Mr. Jewell was followed by E. J. Manion, representing the Order of Railroad Telegraphers; D. W. Helt, president of the Brotherhood of Railroad Signalmen of America; Timothy Healy, president of the International Brotherhood of Stationary Firemen and Oilers; J. G. Luhrsen, president of the American Train Dispatchers' Association, and Mr. Lauck, speaking on behalf of the organizations represented in Groups 2 and 3.

The testimony of Mr. Helt and Mr. Luhrsen dealt with the seven relevant factors which the Board must take into consideration in fixing just and reasonable wages, both maintaining that there is no comparable work in any industry to that performed by the men they represent and that the decreases in the cost of living do not justify a wage cut at this time.

Mr. Manion followed the same reasoning, basing his arguments as to the cost of living on the statement, "that rates of wages in relation to the cost of living extend far back of the period the railroads use in their exhibits as a base and we can never subscribe to the inferred theory that an ideal condition existed during the year of 1915. This Board cannot and must

not proceed on the assumption that a just comparison can be made between wages and the cost of living by using 1915 as a common basic starting point."

Mr. Healy's testimony was directed mainly at the refutation of the statistics given to the Board by the carriers regarding the wages being paid for similar work in outside industries. He presented numerous reports of the Board of Estimate and Apportionment which sets forth rates for employees in building trades in New York City.

W. Jett Lauck Presents Numerous Exhibits

Mr. Lauck then began the presentation of a large number of exhibits. His preliminary statement was directed at minimizing the importance of the cost of living as a factor in the determination of a just and reasonable wage, the contention being that "the living wage principle must first be applied," that "the cost of living principle was only a wartime emergency measure" and that it was not therefore intended as a permanent standard.

In justifying the presentation of his exhibits, Mr. Lauck said in part:

> Mr. Jewell stated that we would not limit our presentation to the specific principles upon which the railroads base their contentions, but that we would enter into a discussion of the fundamentals which underlie the entire question. We are conscious of the fact that among the unthinking and the prejudiced it may provoke some criticism. It will be thought perhaps that we are introducing irrelevant material or indulging in what has been popularly termed as muckraking. We were conscious of the same criticism during the hearings on national agreements. The constant inquiry was made as to when we were going to discontinue the submission of irrelevant matter and confine ourselves to the discussion of "the reasonableness or unreasonableness" of rules.
>
> The results of that case justified our insistence upon fundamentals. In the present case we shall also proceed upon the basis of the fundamentals, not because the consideration of such matters may be colorful, sensational or distracting from what some persons at first blush may consider the real issue but because they are fundamental in industrial justice and equity, and in the consideration of matters which affect the economic and human well-being of ten million men, women and children; and because justice and equity can not come from any decision in this case unless these fundamentals are seriously and deeply considered. We have no doubt that ultimately, as in the case of national agreements, these fundamentals will be recognized and sanctioned.

Financial History of the Railroads Reviewed

Again in submitting several volumes on the financial history of the railroads, Mr. Lauck justified his action by saying:

> In connection with these exhibits we wish to say at the outset that we are not presenting these exhibits to show that if the railroads had not improperly used their resources in the past they would now have abundant funds and it would not be necessary at the present time to ask for wage reductions. We realize that most fortunately the conditions described in these exhibits have been corrected by the Transportation Act and are no longer possible. Our purpose in submitting these data is threefold:
>
> 1. To place on record in this case the fact that large resources have been dissipated or unwisely distributed by railroad financial management in the past, or that railroad management by its issuance of fictitious securities imposed a perpetual drain upon railroad operating revenues and
> 2. That the funds which have been dissipated or absorbed, if they had been used to cover depreciation and maintenance, or used for improvement, or, as a basis for credit to secure permanent additions and betterments, would have obviated the existing inadequacies of railroad management.
> 3. Finally, that these resultant inadequacies of management must be met before in reason or equity a wage reduction can be properly considered.
>
> It is not our purpose to develop the fact that if the results of financial mismanagement had not been as they had been, there would not be in existence now about a billion dollars' worth of securities now drawing dividends and which amount to about $55,000,000 per year, and that the funds which have been absorbed by fictitious securities in the past would have been available to the financial officers and operating officers to keep up maintenance and cover depreciation of equipment and carry on improvements which they have not been able to do under the circumstances and which are now deferred. The employees should not be made a vicarious sacrifice for this past financial mismanagement. That does not help the railroads, but they will have to find some other means than deflating labor to cover the increased costs of operation which have resulted from the happenings in their past history.

All of the Board's session on April 29 was consumed by Mr. Lauck in the presentation of exhibits regarding the "inadequacies of management." The character of Mr. Lauck's contentions regarding the efficiency of the country's transportation system has been outlined in previous issues of the *Railway Age*. Part of the material filed at this time had previously been filed in the controversy over national agreements. However, the scope of the exhibits has been greatly enlarged. Throughout the volumes regarding the alleged "inadequacies of management," the *Railway Age* is quoted extensively, particularly the Six Billion Dollar Number published in January, 1920.

The exhibit on alleged "inadequacies of railway management" is in four volumes, the first two volumes of which deal with alleged economies possible without additional capital investment, the third volume with the economies possible through additional capital expenditures, and the fourth volume with economies possible under unified management.

The manner in which this material is being received by the Board was indicated by Chairman R. M. Barton, who, in discussing the continuation of the employees' presentation, said, "I think it is all far afield, but we want to let in all of the light that is possible on the matter. Your argument is that if we are going to look to the financial condition of the railroads at all, we should consider the fact it is not your fault and the high wages being paid is not the cause of the present condition, but is due to general mismanagement of the past, and in some cases the sins of the fathers have been visited on the children."

To this Mr. Lauck replied: "We go farther than that, we claim that the present plight of the railroad in this time of depression is the result of accumulated evils of financial mismanagement which are expressed now in physical infirmities and impossibility of economical operation, and it would not be equitable to grant a reduction of wages of employees to give financial relief to the railroads until these infirmities of the railroads, which the operating management has inherited from past financial mismanagement, are rectified."

The session was closed with the presentation of additional exhibits regarding the causes of the present industrial depression, Mr. Lauck contending that the influences which have caused this depression have spent most of their force, that the factors of revival have begun to be felt.

Public hearings were resumed on May 2, when representatives of the various independent organizations presented their arguments against wage reductions to the Board. The bases of these arguments were that the wages being paid to the various employees represented are still below those paid for comparable work in other industries and that the cost of living has not declined enough to justify a wage reduction at this time. The independent organizations appearing before the Board at that time include the United Association of Railway Employees of North America, the International Association of Railroad Supervisors of Mechanics, the Order of Railroad Station Agents, the American Federation of Railroad Workers, the International Longshoremen's Union, Knights of Labor, Brotherhood of Station Employees, Railroad Yard Masters, Lighter Captains' Union of the Port of New York, International Union of Steam and Operating Engineers, Dining Car Conductors, Brotherhood of Dining Car Employees, Cooks and Waiters, Philadelphia & Camden Ferry Employees, Railway Men's Benevolent & Industrial Association.

The Board recessed until May 4 when representatives of the train service employees were heard.

Where Traffic is Facilitated

Outlying Switch Control Facilitates Train Movements

Development of Low-Voltage Mechanisms Controlled from a Central Point Has Expedited Traffic

By C. C. Anthony
Consulting Signal Engineer, Santa Rosa, Cal.

Low-voltage electric switch mechanisms were developed by the manufacturers to meet a demand that was somewhat hesitatingly expressed by certain railroad signal men six or seven years ago. It was felt that real economy could be effected by the power operation of certain switches located too far from available points of operation to be reached with mechanical connections. As in so many cases dealt with by the signal engineer, however, there was some uncertainty whether money savings could be proved. At the same time there was a question as to the satisfactory operation of such mechanisms.

It was evident that any net return over the usual items of maintenance cost, interest on investment, etc., would have to come almost entirely from the saving of the cost of stopping and starting trains—unless, in a given case, the operation of one or more switches from an existing interlocking plant or station would save the employment of switchmen or the installation and operation of an additional interlocking plant. And not only was the cost of stopping a train an unknown quantity, but the saving, whatever it should be, might be undiscoverable in the expense accounts. If, then, the financial gain should be invisible, purely theoretical, and the train delays, due to even a few switch failures, would prove to be serious, the signal engineer might be sorry that he had ever urged a low-voltage switch installation. Happily, the step was taken, and the experience of the last few years seems to have proved its wisdom.

Where Low-Voltage Machines Are Advantageous

The situations in which low-voltage switch machines may be used to advantage are of three general classes. First, in connection with existing mechanical or electro-mechanical interlockings, where one or more switches and the necessary signals at too great a distance for mechanical working, may be operated from the existing plant. Second, where switches and signals at such distances may be operated from a station at which operators are continuously on duty; and, in some cases, it may even pay to employ an additional operator for the sake of saving the delay and expense of stopping many trains each day for switches to be thrown by the trainmen. Third, where a power interlocking is necessary and can be installed at a cost less than that of a high-voltage electric plant; as at a drawbridge, where, on account of long bridge approaches, derails must be located at too great distance for mechanical operation.

Interlockings to which remote switches might be connected with advantage are almost numberless. Thus there is frequently a mechanical interlocking at the end of a yard, handling the crossover and yard switches; but, to facilitate train movements double track through the yard has been extended several thousand feet beyond. From the point of view of both safety and economy, it is evidently of advantage to connect up the switch at end of double track, at no increased cost for signalmen, as such a switch has to be thrown twice for each of practically half the trains on the road. So, too, many double-track, and not a few single-track, lines are well provided with mechanical or electro-mechanical interlockings at passing sidings. Progressive railroad officers already realize the absurdity of having an operator sit idly by while a train stops for a switch to be thrown directly in front of the office, when an interlocking of moderate cost would eliminate the stops and increase the safety of operation. But such an interlocking can handle only one switch of each siding, although it is just as desirable that the remote switches be operated from the plant; and this can be done at an operating cost insignificant in comparison with that of the original plant, since there will be little if any increase in the principal item, wages of signalmen.

Similar conditions are met with at many stations where interlockings have not heretofore seemed to be justified. For

example, the operators at a station located at about the middle of a passing siding can readily operate both switches with low-voltage machines; whereas, a mechanical interlocking at one end would do only half the work at a greatly increased cost for additional men. In addition to drawbridges, previously mentioned, a gauntlet through a tunnel or over a bridge can be handled by one set of men at a single interlocking located at one switch, mechanically connected, while the other switch is operated by a low-voltage machine. The work can be done at least as well as, and much more economically than, by two sets of men.

The First and Subsequent Installations

The Northern Pacific is believed to have been the first road to use low-voltage machines. Two were installed in 1914 at the entering ends of passing sidings on double track on either side of the single track through Bozeman Pass tunnel. The purpose was to enable heavy freight trains, on the ascending grades approaching the tunnel, to enter the sidings without stopping. This installation is described in the *Railway Age* of April 16, 1915, page 831. It is said to have worked so far without failure and to have shown a great saving in operating tonnage trains on heavy grades where they are compelled to take siding.

In 1916 five machines were installed on the Nashville, Chattanooga & St. Louis. Four of these are on crossovers at the ends of a short section of double track on a 2 per cent grade, ending at a single-track tunnel at the summit. Crossovers are necessary on account of an engine track at the summit and a runaway track at the lower end. The fifth machine operates an end of double track switch at the foot of the grade, two miles from the point of operation. A sixth machine was installed in 1917 at an end of double track one mile away and across a river from the point of operation. These installations are described in the *Railway Age* of May 31, 1918, page 1323.

Probably the largest single undertaking of this kind is that started by the New York, New Haven & Hartford in the latter part of 1918. This involved the use of about 25 machines at a cost, with signal changes, of approximately $100,000. These machines provide for the operation of all the passing-siding switches not previously interlocked, on the Shore Line between New Haven, Conn., and Readville, Mass., 147 miles. On this double-track line there were already interlocking plants, nearly all mechanical, at the passing sidings, but, of course, only one switch of each siding was connected. With the very heavy train movement, both passenger and freight, it was felt that the expenditure would be amply justified by the saving of delays due to stopping heavy freights for switches to be thrown. The decision to make this extensive installation was based on favorable experience with one of the low-voltage machines that had been in use on that line about two years. The installation, as proposed, was fully described in the *Railway Age* for April 19, 1918, page 1041.

A very advantageous installation on the Philadelphia & Reading consists of the switch and two derails at the end of a third main track operated from a station about 4,500 ft. distant. An average of 39 trains daily pass over this switch, and as a considerable proportion of these trains would have to stop for the switch to be thrown by hand, it may well be admitted that "the time lost in stopping and starting would, when capitalized, amount to much more than the interest on the cost of the present interlocking installation." If there is any doubt about this the other items in the cost of stopping trains should easily show a favorable balance.

In the annual interlocking statistics it is probable that not all the low-voltage switch machines installed were reported. But the information furnished shows that two were installed at the ends of a gauntlet on the St. Louis-San Francisco in 1916, and in 1917 a good many were installed or under construction on the Delaware & Hudson, the New York Central, the Norfolk & Western, the Southern Pacific and the Buffalo, Rochester & Pittsburgh. In 1918 others were installed on the Southern Pacific and one on the Oregon Short Line at a junction switch 1.6 miles from the point of operation. Several are in use also on the Pennsylvania. The Southern Pacific now has 15 machines in service, several at drawbridges where the derails are too far away for mechanical operation. The questions of reliability and of the delays that might result from failures, which, it was felt, required answers from experience, are now regarded as settled in favor of the machines.

The Circuits Required

There seems to be a rather wide choice of circuits for the control of low-voltage switch machines and the signals operated in connection with them. Circuit plans are given in the article on the Northern Pacific installation referred to above. It is evident that line wire may be an important item in the cost of installation, especially if the number required is so great that it is difficult or impossible to provide for it on an existing pole line. Ingenious circuits that economize line wire, while providing all the usual safeguards of power interlocking, have been worked out on the Pennsylvania. Taking the case of a switch, or switch and derail, at an end of double track or siding, with signals for all movements: the primary controls require only five lines, including a common return; one with polarized relay for the switch control; one, with three-position lever and polarized relay selecting the signals as to direction, for the control of all the signals—the selection of signals as to routes being made through circuit controllers on the switch; one with polarized indicator and relay for the indication of both switch and signals; one for track-circuit locking of the switch lever and a stick indicator providing for semi-automatic operation of the signals, and one for the common return. Even at more elaborate single-track layouts, with mechanical interlocking at one end of a siding, and a low-voltage switch machine, and complete signaling at the other, three-position signals, inter-control of the third positions of the main-line signals, track-circuit control of main-line signals between the ends of the siding, and time (not approach) locking, only nine or ten lines are used.

Anticipated Objections to Low-Voltage Machines

The anticipated objections to the use of low-voltage switch machines were the slow movement of the switches and the possible excessive train delay in case of a switch failure. In a great many cases slow movement of the switch is of no consequence, as it can be thrown in ample time before a train is to pass. Even when a train is waiting for another at an end of double track or siding, and should start as soon as the other clears the switch, the delay of, say, 30 sec. while the switch is operating, is insignificant compared with the time that would be lost in stopping or moving very slowly to allow the switch to be set normal by a trainman. It was naturally felt, however, that the delay in case of a switch failure might be very serious. There would be no maintainer close at hand, as there usually is at a power interlocking of any considerable size at least, to clear the trouble or throw the switch promptly. And it would be out of the question for the signalman to leave his office and walk a mile, more or less, to the switch. The usual provision of a crank, accessible to the trainmen, with which the switch machine can be operated by hand, seemed an uncertain reliance because of the possibility that the trainmen, having little experience in its use, might become confused and lose a great deal of time in getting the switch lined up for the required movement. This difficulty, however, seems not to have proved serious in practice. Tele-

phones are, of course, provided so that the trainmen can get instructions as soon as a train is stopped by signal at such a switch. If necessary, no doubt the signalman can usually explain clearly enough what is to be done when the switch has failed to operate.

The Advantages of Low-Voltage Machines

The advantages to be gained by the use of low-voltage switch machines are increased safety and economy. Safety should be increased exactly as in any other case where one or more switches are interlocked and movements over them governed by fixed signals. As specific instances: The switch being under the absolute control of a signalman, a train may sometimes be held on double track or on siding when otherwise, through oversight on the part of the train crew, it might have proceeded before the passing of the last of two or more trains for which it should have waited; although, of course, block signals might prevent any disastrous result from such an error. Or a side collision with a train pulling out of a siding may be prevented; for flag protection in this case is apt to be particularly desultory.

Economy, as previously remarked, is sometimes difficult to prove. Leaving out of account the more obvious cases, such as the operation of derails at too great distance for mechanical connection—where an interlocking plant is a necessity and would otherwise have to be a small power interlocking with its own power plant, any economy in the low-voltage operation of remote junction, passing-siding or end of double track switches, must usually be found in the saving of train delays and the more direct cost of stopping and starting trains. On this subject an article by the writer in the *Railway Age* for May 2, 1919, page 1105, may be of interest. It is perfectly clear that it costs money to stop a train at an intermediate point. The only question is, how much. It may not be possible to do better than make a conservative estimate of the cost, direct and indirect, for given conditions. But an amount having been arrived at which is deemed reasonable by those having to pass upon the proposition, it is a simple matter of arithmetic to find out whether it will pay to install one or more low-voltage switch machines at any point under consideration. There is practically no doubt, however, that, at numerous places all over the country, it will pay, and pay well, to make use of these machines.

The Cost of Transportation In Relation to Other Cost Factors

By Julius H. Parmelee
Director Bureau of Railway Economics

IN A TIME of economic readjustment, when prices, wages and costs are constantly shifting, and no one factor in production and distribution is stable with respect to any other factor, the problem of ascertaining the relative position of any one of the factors is difficult. For example, it may be asked whether the cost of transportation to the users of the railways, that is, the level of railway freight and passenger rates, has increased in greater ratio than other production costs, whether it has remained stationary, or whether it may even have declined, relatively speaking. The inquiry is pertinent at any time, especially so when, as at present, the whole fabric of railway expenses and charges is being closely scrutinized; expenses, through the examination of wage levels now being conducted by the Railroad Labor Board, and charges, through daily analysis by the Interstate Commerce Commission of the effect of increased railway rates.

The fundamental reasons why there is so much interest in railway rates at present, and in their effect on and relation to production costs and general prices, are two: First, economic conditions are in process of post-war liquidation, and the effect of every factor on all other factors becomes of relatively greater importance than usual; secondly, the increased rates instituted by the Interstate Commerce Commission in August, 1920, became effective at almost the same time that prices commenced to decline, a decline that has been maintained virtually without interruption to the present moment. Prices were at their peak in the months of May and June, 1920, and the present decline started in July. The decline in prices has led many to inquire whether railway rates may not now be at a relatively higher level than before the war, and whether they ought not to be reduced. By "relatively higher" is meant an upward trend in rates greater in degree than the upward trend in prices. If rates go up 60 per cent during a given period, and prices 50 per cent, rates are relatively higher at the end than at the beginning of the period.

Before taking up the question of the relative position of railway rates, it is well to note that even if rates are found to be relatively higher than formerly, such a result would not *per se* call for their reduction. What determines the level of freight and passenger rates is not primarily their relation to other economic factors (although that relation cannot wholly be ignored) but the financial needs of the railways. Of necessity, if the United States is to have an adequate and efficient transportation system, the public must pay for their transportation service such rates as will meet the cost of the service plus a reasonable return on the investment. So, and only so, can the service be continued efficiently and satisfactorily. If under these conditions transportation rates should at any time become, and remain, relatively a greater proportion of the cost of production, then the economic structure must be adjusted to such greater proportion, for without adequate rates the transportation system would break down, and with its breakdown all economic processes would go to their ruin.

As a matter of fact, compared with the situation in the last normal pre-war year of 1913, transportation rates have not assumed a relatively greater weight among the cost factors in the production, but have lagged behind. For the greater part of the period since 1913 they have lagged far behind, although the rapid decline in prices during the latter half of 1920 went far toward closing the gap.

In showing the facts underlying this statement, the year 1913 will be taken as the base year, and later data will be related to the averages for that year. The year 1913 is selected as the base year because that was the last complete year prior to the outbreak of the war in 1914, also because the Department of Labor's price statistics are related to the year 1913 as a base. The average receipts per ton mile in 1913 were lower than in any other year save two. This being so, the increase in any subsequent year will be greater than if the comparison were made against most other years: that is, selection of 1913 tends to weight the scale against the railway rates, and makes it by so much the harder to prove either that rates have gone up at a relatively lower rate than prices, or that they have increased at a greater rate, but only slightly greater. The lower the point from which a given increase is measured, the greater the increase will be, and the higher the percentage of the increase, because computed on a lower base as divisor.

Comparison will be made of the increase in freight rates (stated in terms of average receipts, or price per ton mile) from 1913 to the latest date for which statistics are available, and the increase in the average wholesale price of 327 commodities, as determined by the Bureau of Labor Statistics of the U. S. Department of Labor. These are official statistics, the large number of commodities included makes it sure that the basis of measurement is a broad and representative one, and the several commodities are averaged together in proportion to their relative importance. The prices are whole-

sale prices, it is true, but speaking generally, the trend in wholesale prices in the long run tends to parallel the trend of retail prices. In fact, changes in wholesale prices usually precede corresponding changes in retail prices, and the recent sharp declines in wholesale prices have not been fully reflected as yet in retail prices. In this respect, as well as the one indicated above, the comparison will run against the railways.

Beginning with the year 1913, the changes in average receipts per ton mile (stated both in actual figures and in percentages of the 1913 average) and in the index number (or relative average price) of all commodities have been as follows:

Year or month	Average receipts per ton mile Actual-cents	Average receipts per ton mile relative	Index number of wholesale prices
1913	.719	100	100
1914	.723	100	100
1915	.722	100	101
1916	.707	99	124
1917	.715	100	176
1918	.849	118	196
1919	.973	135	212
1920	1.052	146	243
September, 1920	1.151	160	242
October, 1920	1.226	171	225
November, 1920	1.263	177	207
December, 1920	1.209	168	189
January, 1921	1.192	166	177

This comparison shows that as late as January, 1921, prices were 11 points higher than rates, even after the considerable decline in prices since the summer of 1920. The index number of prices was 177, while the relative of rates was 166.

It should also be observed that up to the close of 1920 rates lagged far behind prices. In 1916 rates were at 99 and prices at 124; in 1917 the spread was between 100 and 176, prices being up three-quarters with no appreciable change in rates; in 1918 the spread was 118 and 196; in 1919, 135 and 212, and in 1920, 146 and 243. In 1920, therefore, prices had outrun rates by almost 100 points, that is, by 100 per cent of the 1913 base.

The turn came in September, 1920, when rates started up to 160, then to 171, then to 177, and finally declined to 168 and 166; whereas prices declined from 242 in September to 225 in October, and then to 207, 189, and finally to 177.

In February, 1921, the price relative was 166, while rates were at probably the same point. For the first time since 1914, therefore, freight rates had become relatively as high as prices. It must be recalled in this connection, however, that railway rates in the years 1913 to 1917 were the lowest on record, and that the railways were even then finding their revenue inadequate to meet expenses and fixed charges. It was during those years that the railways were appealing for higher rates, in the Five Per Cent Case of 1913-14, the Western Rate Case of 1915, the C.F.A. Class Scale Case of 1916-17, and the Fifteen Per Cent Case of 1917. Thus in February the situation had temporarily assumed the same relation as in 1913-1914, when rates were low, in fact too low for the financial security of the carriers.

One point in this connection deserves comment, and that is the effect of increased rates on prices and on business. It was freely predicted in August, 1920, that increased freight rates would still further increase prices, and would shut off traffic. *Both predictions proved incorrect.* As already pointed out, prices have been declining ever since the increased rates went into effect, so that the effect of the higher rates has not been in the direction of boosting prices. Respecting the effect on traffic, the months of September and October, following the rate increase, showed no ill effects from the increased rates. On the contrary, September traffic was good, while October traffic was with one exception the greatest ever handled by the railways in a single month. Beginning in November, traffic has declined heavily, but the underlying reason has been not the increased rates, but the general business depression.

The Peculiar Position of the Denver, Boulder & Western

By J. B. Day

A SITUATION apparently without parallel in the history of rail transportation has been precipitated by a decision and order of the Colorado Supreme Court, stipulating that the defunct Denver, Boulder & Western Railroad, which operated from Boulder to Ward and Eldora, in the north-central part of Colorado, shall resume operations, notwithstanding the fact the road was junked nearly two years ago—its rails torn up, its locomotives sent to China, South America and other far parts of the globe, and its coaches and freight cars sold to other lines.

Asserting, in effect, that Humpty Dumpty cannot be put together again, officers of the defunct road have, through E. E. Whitted, the road's attorney, filed with the state public utilities commission, the medium through which the decision of the Supreme Court was passed on to the company, a petition asking that they be excused from obeying the order. There the matter rests at present. Attorneys, railroad men and Colorado residents, generally, are awaiting the final outcome with keen interest.

The history of the Denver, Boulder & Western road, known as "The Switzerland Trail of America," because of the scenic grandeur along its route, makes one of the most absorbing chapters in the romantic story of the Centennial State.

Built a score of years ago, to tap rich mining fields and unfold for the benefit of Coloradoans and visitors within the state's borders a panorama of nature's wonders declared to be unsurpassed anywhere in the United States, the road represented a vast outlay of money, and was considered one of the greatest engineering feats accomplished up to that time.

The road was built in the shape of a "Y," having for its stem a 13-mile stretch of track from Boulder to the town of Sunset. At Sunset the road branched, one line running southeast, to Eldora; the other northeast, to Ward. The Eldora branch was 20 miles long; the Ward branch, 13 miles. From the terminus at Eldora a wagon road extended to the famed Arapahoe peaks and glacier. An automobile stage road connected the Ward terminus with the celebrated Estes park.

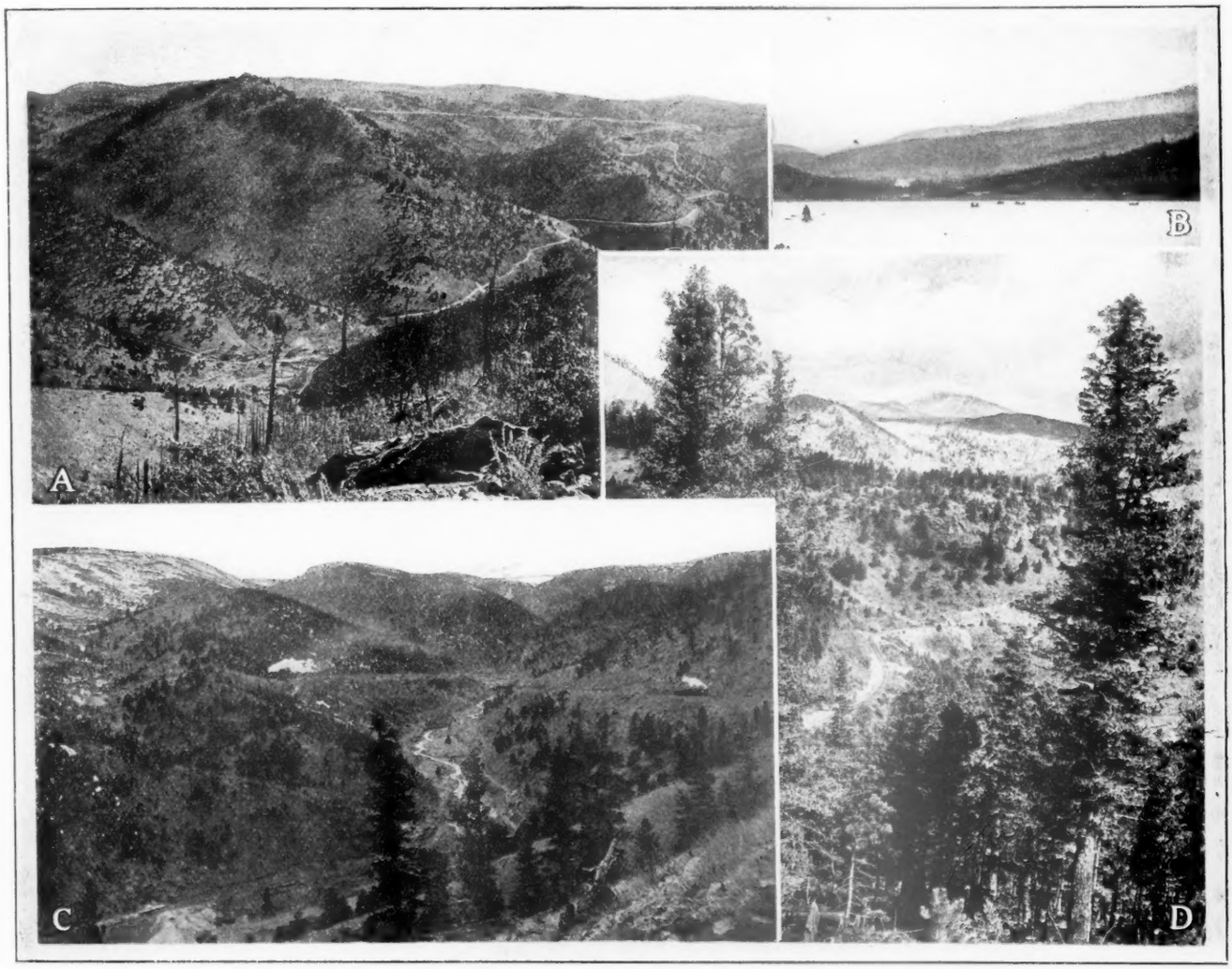
Some idea of the engineering feat involved in the building of the road may be gained from the fact that in the 26 miles between Boulder and Ward it climbed from an altitude of 5,333 feet to 9,450 feet, without a tunnel. In a nine-mile stretch between Sunset and Glacier Lake, on the Eldora branch, the road ascended 1,300 feet, winding and twisting in and out like a huge serpent.

But the road, according to its officers, was never a financial success. In 1917, when the soaring costs of materials and labor added to its financial burden, officers of the road petitioned the public utilities commission for permission to discontinue service and junk the property. The petition was resisted by various residents and mining companies in the territory tributary to the road, and the commission ordered the company to continue operations, granting it permission to increase freight and passenger rates as a means of coping with its financial difficulties. On July 23, 1919, the company again petitioned the commission for permission to junk the road, asserting the increased rates had not proven sufficient to balance operating costs. The petition was granted the following month, and the work of dismantling the road was begun shortly afterward.

The city of Boulder, the Boulder Commercial Club, and various mining companies along the route of the road protested the order, and when the commission declined to grant their petition for a rehearing they took the case into the Supreme Court. They failed, however, to ask for an order to stop the dismantling of the road pending the decision of

the court, with the result that the junking process was practically complete when, in July, 1920, the court handed down its decision holding the public utilities commission should not have permitted the road to discontinue service. The court declared in this decision that it had not been conclusively shown that the road could not be operated at a profit under normal conditions, if allowed certain concessions in the way of increased freight and passenger rates.

A rehearing of the case was asked for and granted. On March 7, 1921, the court handed down a decision upholding its previous finding, and two days later issued an emphatic order to the utilities commission to vacate the permit under which the road discontinued operations. In the meantime, the junking of the road had been completed.



Scenes on the Denver, Boulder & Western

A—The climb above Sunset station. This photograph gives an excellent idea of the topography of the territory through which the road passed, and of the engineering difficulties encountered in building it; B—Glacier lake, on the Eldora branch. This lake is formed by the snow waters from the famed Arapahoe peaks and glacier; C—Four Mile canyon at what was known as "The Parting of the Ways," where the road forked, one branch to Eldora, the other to Ward; D—A view of the famed Long's Peak, Estes Park.

In compliance with the mandate of the court, the commission, on March 14, issued an order requiring the road "to resume operations until it shall have made a fair test of its ability to earn the necessary income to justify its further operation."

On March 26, Attorney Whitted filed the supplementary petition with the commission, asking that the road be excused from complying with the order.

The petition asserts that it is physically and financially impossible to obey the order; that the company acted lawfully throughout the junking process, and that the mining companies and other protestors should have taken steps to stop the work of dismantling the road until the decision on the protest had been arrived at.

Quoting the language of the act under which the state public utilities commission was established, in 1915, the petition seeks to show the company was entirely within its rights in proceeding with the junking process, because of the failure of the protestors to ask the Supreme Court to stay the work of dismantling.

The act states specifically that the pendency of a writ of review from an order or decision of the utilities commission "shall not of itself stay or suspend the operation of the order or decision," and that, in the event a stay is asked for and granted, it "shall not become effective until a suspending bond shall first have been filed with and approved by the commission."

Continuing, the petition says that several hundreds of thousands of dollars more than the price received for the junked material would be necessary to rebuild the road and resume operations, and that the company has no money and insufficient credit to undertake the rebuilding.

The petition declares further that there is not and never has been sufficient business tributary to the road to provide

a return large enough to pay operating expenses and taxes, and that to require the company to obey the order to resume operations would be, in effect, confiscatory. In conclusion, the petition asks that the commission find that the road's acts have been lawful throughout the proceedings; that the commission set aside its order requiring the road to resume operations, and that the road be exonerated and excused from obedience to the order.

Charles D. Marvin, of Boulder, was president of the company which operated the now defunct road, and William M. Culbertson, of Erie, Pa., was vice-president. L. R. Ford, of Boulder, was general manager.

Open Executive Committee Meeting of Air Brake Association

IN LIEU OF THE twenty-ninth annual convention, which was postponed because of the prevailing business depression, the Executive Committee of the Air Brake Association held an open meeting at the Hotel Sherman, Chicago, on May 3, for the conduct of the essential business of the Association and to receive the committee reports and papers prepared for presentation and discussion at this year's convention. The reports and papers were presented in abstract only and were received without action or discussion, it being the plan of the Executive Committee to issue them to the membership in proceedings form and to bring them up at the next regular convention for final disposition by the membership as a whole.

The following reports and papers were presented.

Report of the Committee on Recommended Practice; Tests of Steam Heating Apparatus on Locomotives and Passenger Cars, Montreal Air Brake Club; Terminal Tests to Insure Effective as Well as Operative Brakes, Pittsburgh Air Brake Club; The Schedule "U C" Brake; The Brake Pipe Vent Valve, Central Air Brake Club; and Report on Air Consumption of Locomotive Auxiliary Devices.

A Terminal Test to Secure Effective Grade Brakes

The paper presented by the Pittsburgh Air Brake Club suggests an extension to the retaining valve and pipe of the same close attention which has been so effective during the past few years in reducing brake cylinder leakage to a point where practically 100 per cent of all brakes are now operative, pointing out the importance of the retaining valve as a factor in making operative brakes effective in grade work. An abstract of the paper follows:

The method used in making the terminal test has become well established practice, its object, of course, being to determine the number of operative brakes in the train. This insures that as far as ordinary stops are concerned the trains can be stopped in a reasonable distance, but it does not insure that these same trains can be controlled and stopped on certain grades. It is for this reason that the recommendations in this paper are presented for the consideration of this Association.

A very few years ago it was found by actual terminal tests of freight trains that approximately 30 per cent of 51 trains tested had less than the required 85 per cent operative air brakes. This condition, of course, was due to excessive brake cylinder and cylinder pipe leakage.

During the 1917 convention a paper was presented by R. C. Burns, then chief air brake inspector of the Pennsylvania, recommending that, instead of doing this kind of work on the repair or shop track, the piston and leather should be taken to a shop provided with necessary facilities for proper cleaning, lubricating and testing of packing leathers.

The recommendations suggested at that time have since been recommended by the American Railway Association and most of the large railroads of the country are now using this method for taking care of brake cylinder packing leathers. As a result brake cylinder leakage has been reduced very materially, since recent tests of a large number of trains show that operative brakes are now very close to 100 per cent.

It is well known that in order to control heavy tonnage freight trains down heavy grades with air brakes exclusively, the air brakes must be in good condition. In order to assist in increasing the per cent of effective brakes up to the point where they will equal the per cent of operative brakes, the Pittsburgh Air Brake Club recommends that the present terminal test be modified to insure an effective grade brake as well as an operative brake.

A terminal test of a number of freight trains in any yard no doubt will disclose trains with 95 per cent to 98 per cent operative brakes. But subject these same trains to a retaining valve test and it will be found in all probability that there are only 45 per cent to 55 per cent effective air brakes.

To insure a full recharge of the brake system between the time of release and the time of next application, the retaining valve and pipe should be in such condition that the brakes will remain applied from two to four minutes, and have a good exhaust of air from the brake cylinder when the retaining valve handle is turned down.

In order to ascertain the percentage of effective brakes, a retaining valve test should be made with all retaining valves in holding position. Following an initial fuel service application and release, succeeding full service applications and releases are made at four-minute intervals until the train crew or inspectors have completed the inspection of the train. Following the whistle signal at the first application the crew or inspectors, stationed at the front and rear of the train, wait two minutes after the release of the brakes is heard and then start over the train, turning down retaining valves as they go. They continue to do this until the signal for the next application is given and two minutes after the next release, repeat the process. This is continued until the retainers are all released. Ineffective brakes are indicated by a lack of exhaust, or only a faint exhaust at the retainer when the handle is turned down.

If this test could be substituted for the present terminal test, there is no reason why the latter could not be eliminated for the reason that the retaining valve test determines both the number of effective brakes and the number of operative brakes as well.

The retaining valve test was conducted on eight freight trains last summer, all coal trains, 50 cars per train, and it was found that a fast man would turn down as many as 10 retaining valves in the two minutes allotted between the release and application of the brakes, but the average was found to be about eight cars in each two-minute period. It would, therefore, require on a 50-car train approximately 12 minutes to make the test with two men, one starting at the front and the other at the rear end of the train.

The tests of the eight trains just referred to developed the fact that with from 88 per cent to 100 per cent of the brakes operative only 40.7 per cent to 71.7 per cent of the brakes were effective. The tons per effective brake ranged from 112 to 143. If every operative brake had been an effective brake the tons per good brake would have ranged from 62 to 83.

It is also recommended that when cars are going over repair or shop tracks, even though they are in date, they should be submitted to a retaining valve test and if the combined leakage of brake cylinder, retaining valve and pipe, exceeds 12 lb. per minute, the brake equipment should receive attention.

It is believed that if these recommendations are adopted by the railroads in general, only a short time will elapse until all freight brakes will be in condition to control trains down average grades.

Effect of Train Speed on Energy Consumption

This Relationship Directly Involves One of the Largest Expenses of Freight Train Movement

By G. S. Chiles and R. G. Kelley

ESSENTIALLY, the movement of traffic between terminals is simply a problem of the application of mechanical energy to overcome train resistance. Many conditions affect the cost of producing and applying this energy as well as the amount of energy which must be expended. Some of these conditions are beyond control, but others, such as train loading and speed, are subject to a considerable measure of control. The following discussion will be confined to a consideration of the effect of train speed on the amount of energy which must be applied to effect a given freight train movement, or in other words, to produce a given number of gross

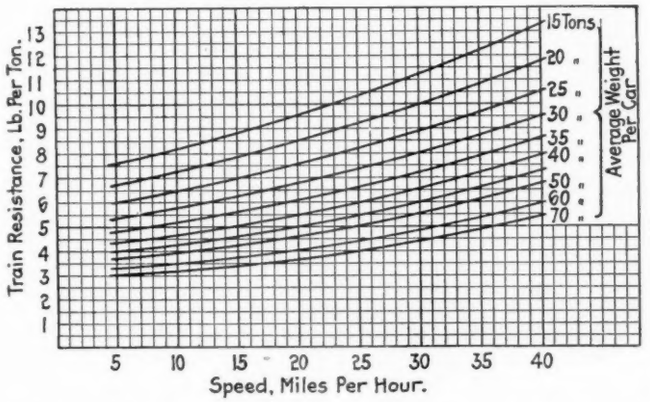


Fig. 1—The Relation Between Resistance and Speed, for Various Average Weights per Car

ton-miles. This consideration is of importance because it directly involves the locomotive fuel bill, which constitutes practically one-half of the direct expense of train movement.

In considering the amount of work or mechanical energy expended in freight car movement it is always somewhat difficult to determine the influence of any one of the several factors, such as the number of cars, weight of cars, train speed, condition of rail and right of way, weather conditions, etc., all of which enter into that complex quantity termed freight train resistance. In car resistance formulas there are usually three variables recognized as affecting car resistance, viz., speed, average weight of cars, and air temperature or weather. However, in order to analyze the effect of speed alone on the energy expended, the other variables will be eliminated by the assumption of constant car weight and weather conditions.

The best available data on freight train resistance were developed by Edward C. Schmidt as the result of an elaborate series of tests on the Illinois Central, published in 1910 in Bulletin No. 43 of the University of Illinois Experiment Station, and the resistance curves determined from these tests will be used. These are shown in Fig. 1.

When force is applied to the draw-bar of a car and is sufficient in amount to cause the car to move, work is performed. The amount of work performed depends on just two factors, namely, the force applied and the distance through which it acts. If the car is moved at a uniform rate of speed on straight, level track in still air the force acting, expressed in pounds per ton, is equal to the train resistance, as shown in Fig. 1.

Work is the product of force and distance. Power is the rate of doing work. It is important that work and power should not be confused. In the case of train movement, the distance (the operating district) is fixed and the work done in completing a movement is directly proportional to the force required to effect the movement under its particular set of conditions. The power required will depend on the time allowed for the completion of the movement.

The values for the resistance of cars of 20 tons, 40 tons and 75 tons gross weight, taken from the curves in Fig. 1, are shown in the table and may be considered as typical of the minimum, the average and the maximum car weights generally encountered in freight train make-up.

EFFECT OF SPEED ON TRAIN RESISTANCE OF 20-TON, 40-TON AND 70-TON CARS, ON STRAIGHT, LEVEL TRACK

	Train resistance					
	20-ton cars		40-ton cars		75-ton cars	
Speed m.p.h.	Lb. per ton	Per cent inc. over 10 m.p.h.	Lb. per ton	Per cent inc. over 10 m.p.h	Lb. per ton	Per cent inc. over 10 m.p.h.
5.....	6.8	...	4.4	...	3.0	...
10.....	7.3	...	4.7	...	3.2	...
15.....	7.9	8.0	5.1	8.3	3.4	6.0
20.....	8.5	16.3	5.5	17.0	3.7	15.5
25.....	9.3	27.0	6.0	27.5	4.0	25.0
30.....	10.0	37.0	6.6	40.0	4.5	40.5
35.....	10.9	49.5	7.2	53.0	4.9	53.0
40.....	11.8	62.0	7.9	68.0	5.5	72.0

Referring to the table, and using as a base 10 miles an hour, which is the lowest speed likely to be maintained for any great length of time, it will be seen that there is a well defined proportionate increase in the amount of energy required to move trains made up of cars averaging respectively 20 tons, 40 tons and 75 tons gross weight per car for all speeds above 10 miles an hour and that within the range of speeds likely to be encountered in freight train operation, this proportionate increase does not vary materially for cars of the

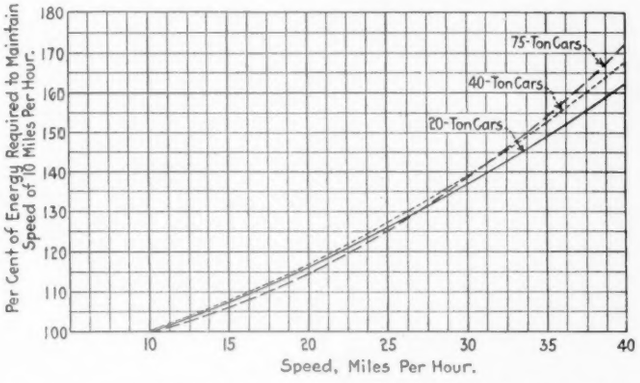


Fig. 2—Proportionate Increases in Energy Required to Move Cars at Speeds Above 10 m.p.h. on Straight Level Track

different weights. These facts are shown graphically in Fig. 2.

It, therefore, seems evident that the total work expended in freight car movement is materially influenced by changes in the speed of train movement anywhere within the whole range of practicable freight train speeds. Maximum efficiency in ton-miles produced per unit of mechanical energy expended would evidently be attained at about five miles an hour. Of course, the savings to be effected in train and engine crew

wages, fixed charges on investment, and in the improved efficiency of conversion of the chemical energy of the coal to mechanical energy at the drawbar, actually fix the most economical running speed considerably above five miles an hour.

The final determination of the best speed for freight train operation is a complex problem which can only be solved after taking into account the many special conditions affecting each case as well as the fundamentals of general application. This article will have served its purpose if it clearly draws attention to one of the latter which has not generally been taken into account in discussing the possibilities of increasing freight train speeds. Its importance is evident from the fact that even under present conditions, with punitive rates for overtime, the fuel cost of train movement is but a fraction of one per cent less than the cost of engine and train crew wages.

Commercial Stocks of Coal

WASHINGTON, D. C.

A PRELIMINARY REPORT on commercial stocks of coal as of April 1 has just been made public by the United States Geological Survey, giving results of an inquiry conducted in part for the purpose of ascertaining whether the low production of coal thus far this year has been due mainly to undue postponement of coal purchases or whether it has not been due in part to the accumulation of reserves as a result of decreased consumption. The preliminary estimate indicates that on April 1 the stocks on hand of bituminous coal were approximately 37,000,000 tons as compared with about 45,000,000 tons on January 1. If the draft upon stocks is not soon checked, the report states, reserves will fall below the level of safety, but the report indicates that the slump in production is to a considerable extent due to decreased consumption. The railroads on April 1 had a reserve of about three weeks and five days' supply or about the same as on January 1. An abstract of the report of which the figures are still subject to revision, follows:

Stocks of coal are significant because they are the consumers' reserve against a possible interruption in supply. Such interruptions have occurred in the past through mine strikes, traffic congestion on the railroads, or severe weather interfering with the delivery of loaded coal. When stocks are large, consumers can delay purchasing until offered favorable terms. Small stocks, on the contrary, drive many consumers to enter the spot market and conduce to higher prices. The condition of stocks, therefore, has an important effect on the coal market, and is a matter of consequence to all who buy and sell coal in quantity. In considering stocks, a sharp distinction must be made between anthracite and bituminous coal.

Current Production and Consumption

Production of bituminous coal declined steadily from December, 1920, to the end of the coal year, March 31. In late March and early April, the soft coal miners were working on the average only two or three days a week. Mine capacity and demonstrated transportation facilities sufficient to produce another 6,000,000 tons of coal every week, were and still are lying idle. An army of men dependent on the mines for livelihood are unemployed, or at best, working but a few hours a week. From a maximum of 12,800,000 tons a week in December, production had sunk to a bare 6,000,000 tons, the lowest point (except, of course, for the great strike of 1919) touched since April, 1914. Indeed, if the growth in the country's requirements during the past seven years be considered, the present depression in the soft coal industry is more acute than that of 1914, and one must go back to the panic of 1893 to find its parallel.

At first thought, this profound slump in production might give ground for alarm as to the sufficiency of next winter's supply of coal. Before, however, it is assumed that the slump in output foretells a shortage of coal, two other facts must be taken into account. The first fact is that the slump was preceded by several months of heavy production, which brought the total output in 1920 up to 556,000,000 tons, exceeding even the war year, 1917, and approaching the record production of 1918—579,000,000 tons. Not all of this large output was consumed or exported. Some millions of tons of it were added to consumers' stocks, and it was to be expected that these stocks would be drawn upon during the late winter. The second fact to be remembered is that the slump in output was accompanied by a great cut in consumption. While complete data on current consumption are lacking, there is enough evidence to show that the combined domestic consumption and exports during the first quarter of 1921 were 20 per cent less than during the first quarter of 1920. Comparing the month of March, 1921, with March, 1920, the decrease was about 30 per cent.

Piecing together the available facts concerning production, consumption and stocks, it appears that the output during the first quarter of the year 1921 was 100,000,000 tons; that consumption and exports were in round numbers 108,000,000 tons, and that the deficit between production and consumption was made up by a draft upon consumers' stocks of about 8,000,000 tons.

Moreover, this draft upon stocks did not end with March 31. Although the returns for the week ended April 23 show an increase in production, the total output for April will fall short of the total consumption. Six million eight hundred and twenty-nine thousand tons a week is not enough to meet our current requirements, even in the present atmosphere of business depression.

A final estimate of the total stocks on hand can not be made until more complete returns are received from consumers. It is, however, possible to state that the stocks on hand as of January 1, 1921, were somewhere between 42 and 48 million tons—say 45 million, and that on April 1 they had fallen to somewhere between 34 and 39 million—say 37 million. In the following table are given the stocks at various times in the past:

Estimated Total Commercial Bituminous Coal in the United States
(Net Tons.)

October 1, 1916	27,000,000	January 1, 1919	57,900,000
October 1, 1917	28,100,000	April 1, 1919	40,400,000
July 15, 1918	39,700,000	March 1, 1920	24,000,000
October 1, 1918	59,000,000	June 1, 1920	20,000,000
Day of the Armistice	63,000,000		

Coal in transit not included.

Stocks Held by Different Consumers

Retail Yards.—Stocks of bituminous coal in the yards of retail coal merchants were greater on April 1, 1921, than on the corresponding date two years before, and very much greater than last year. The 1,107 dealers reporting had an average of four weeks' and two days' supply on January 1. They reduced their stocks by 15 per cent during the three months from January to March, and on April 1 their supplies were sufficient for three weeks and five days. The maximum stock carried by retailers during the period over which the records of storage coal extend was five weeks and four days on January 1, 1919.

Railroad Fuel.—The railroads of the country had about three weeks' and five days' supply of coal in cars, stock piles and chutes on April 1. Reports from 283 roads had been assembled by the American Railway Association up to Friday, April 29, and complete returns for all roads are promised. The 283 roads had on hand 6,741,000 tons as of January 1, and almost exactly the same amount—6,737,000 tons—on April 1. This was equivalent to 26 days' requirements at the going rate of consumption. Thus while the quantity of coal purchased currently by the roads apparently decreased, their consumption had so decreased that their takings sufficed to maintain their reserves. It is not yet possible to state the railroad fuel stock in tons, but by expressing it in terms of weeks' supply, it may be compared with the stock on other dates. Like the majority of other consumers, the railroads are much better stocked with coal than they were in 1920, but have no such reserve as they carried in 1918 and early 1919.

The coal in transit forms a sort of mobile reserve as opposed to the stationary reserve in the bins of consumers. This mobile reserve includes not only the coal in cars, but also the coal on the commercial docks at the head of the Lakes. The tonnage on the docks is normally greatest in the fall at close of navigation, and least in the spring when navigation opens.

Complete returns concerning the carry-over on April 1, 1921, are not yet available, but the total is thought to be at least 2,250,000 tons. The following statement shows the bituminous coal on hand at the opening of navigation, held by companies now reporting to the Northwestern Coal Dock Operators' Association. Though imcomplete, the figures cover an identical group of companies operating at Duluth, Superior, Ashford and Washburn:

1917	387,968
1918	987,246
1919	2,439,749
1920	514,902
1921	1,643,034

Though smaller than in 1919, the 1921 carry-over was much larger than in either of the war years, and three times as great as last year.

General News Department

The hearing before Examiner Barclay of the Interstate Commerce Commission on the cost of repairs to locomotives sent by the New York Central to outside shops, originally set for hearing at New York on May 9, has been postponed until May 23.

The New England Railroad Club, at its regular meeting to be held at the American House, Boston, on Tuesday evening, May 10, will listen to a talk by E. S. Jones, official photographer of the Boston & Maine, on New England: its lakes, rivers, mountains, seashore and history. The lecture will be illustrated with original colored lantern slides.

Express messengers and others who, for several weeks, have been on trial in the federal court at Macon, Ga., on charges of a conspiracy to rob the American Railway Express Company, were sentenced on April 30. Thirteen men were sentenced to terms in the penitentiary, and 28 others were fined in amounts ranging from $300 to $3,000.

In a bold theft of mail bags at the station of the Central of New Jersey at West Eighth street, Bayonne, N. J., on the morning of April 30, the baggageman at the station was shot and wounded. The robbery occurred before daylight, immediately after the bags had been left by a southbound train. Seven men were arrested soon afterward and were held in $25,000 bail, each, for a hearing this week.

The Missouri Pacific has abolished its Valley division, effective May 1, and has assigned the Pine Bluff district from Little Rock, Ark., to McGehee, to the Arkansas division, the McGehee district, from McGehee to Monroe, La., and the Hamburg district, to the Louisiana division and the Lake Providence district, the Eudora district and the Arkansas City and Warren branches to the Memphis division.

Officers of the Mobile & Ohio and representatives of the two organizations representing unskilled employees of that road, have agreed upon a reduction in wages of approximately 20 per cent below the rates prescribed in the United States Railroad Labor Board decision No. 2. The new rates became effective April 16. The reductions apply in all departments of the service where unskilled laborers are employed, including track, bridge, building, shop, coal chute, cinder pit, dock and freight house workmen.

The full crew law of Pennsylvania, which has been in force in that State since July, 1911, will be repealed by an act passed by the legislature last week, and since signed by the governor, authorizing the Public Service Commission to regulate the number of men to be employed in each train crew. The House adopted this bill by a vote of 110 to 88. In 1915 the legislature voted to repeal the full crew law, but its action was vetoed by Governor Martin G. Brumbaugh.

Senator Frelinghuysen has introduced in the Senate a bill to provide for the payment of a salary to Henry J. Ford, who served as a member of the Interstate Commerce Commission until March 4 under a recess appointment, after the Senate had failed to confirm the original appointment. M. W. Potter, who served in the same way, is entitled to his salary for the period because he was later reappointed and the Senate voted confirmation. Mr. Ford has been retained by the Interstate Commerce Commission as special assistant.

Three of the five bandits who participated in seizing the ticket receipts of the New York Central at Toledo, Ohio, on January 17, as the money was being moved from the station to the bank when two railroad detectives were murdered, have been captured. Frank Seward, the last of the robbers apprehended, was injured in trying to make his escape from officers who had been sent to arrest him at Omaha, Neb., on April 25, and later died from self-inflicted wounds. The other two bandits captured have been sentenced, one to life imprisonment and one to be hanged.

Bird M. Robinson, President of the American Short Line Association, says that about 75 per cent of the employees of the short lines of the country have accepted reductions in wages. The amount of the reductions is not known with precision, but Mr. Robinson thinks the percentages were as great, and perhaps in some cases greater than, the reductions proposed by the larger railroads. It is said that nineteen disputes now before the Railroad Labor Board involve "short lines" and Mr. Robinson plans to go before the Board and show that that body has no jurisdiction of roads which were not operated by the government during the war.

V. Fitzpatrick, speaking for 15 organizations of strikers who left the services of the Atlanta, Birmingham & Atlantic on March 5, wrote last week to B. L. Bugg, receiver in charge of the road, requesting a conference, as suggested by the Railroad Labor Board, in its decision on the A. B. & A. controversy (reported in the *Railway Age*, April 29, page 1036); but Colonel Bugg, in a long reply, declines to confer; his new employees are satisfactory; the public is being served, by both passenger and freight trains, and Mr. Fitzpatrick's constituents, having voluntarily left, are not now employees and have no standing before the Labor Board. Colonel Bugg calls attention to the fact that Judge R. M. Barton, chairman of the Railroad Labor Board, filed a dissenting opinion, declaring that the decision of the Board in this matter was based on a misconception of the law. Judge Barton believes that the action of the Federal Court in Georgia was wise, and fully justified.

Railroad Surgeons' Meeting

The first annual meeting of the Medical and Surgical Section of the American Railway Association is to be held at Hotel Westminster, Boston, Mass., on Friday and Saturday, June 3 and 4. Members attending this meeting will be accorded half rates on Pullman sleeping cars, for themselves and their families, the arrangement being to pay full fare both ways, taking receipt, and then making application for refund, afterward, through the secretary of the Section, J. C. Caviston, 75 Church street, New York city.

Elimination of Transportation Taxes Not Included in Tax Revision Plan

Secretary of the Treasury A. W. Mellon, in a letter to the chairman of the Congressional committees, proposes a plan of tax revision, including a repeal of the excess profits tax on corporations and a possible substitution of a flat additional tax on corporations. He recommends the retention of the transportation tax on freight and passengers. It is objectionable and he wishes it were possible to recommend its repeal; but it produces about $330,000,000 in revenue per year and could not safely be repealed or reduced unless Congress is prepared to provide an acceptable substitute.

St. Paul Employees Want to Acquire Stock

Employees of the Chicago, Milwaukee & St. Paul have started a movement to acquire stock in the company. At a recent informal dinner of the employees of the auditor's office, 189 employees subscribed for 379 shares of the stock. They formed the "Action Club" and each employee owning a share of stock will wear a button on which will be inscribed, "I Am An Employee Stockholder." When the subject was discussed at the dinner the

clerk who proposed the purchase of stock by employees said the company offered nothing and that officers of the road were in no way back of the proposition. Arrangements will be made to purchase the stock through brokers and payment will be made on the installment plan.

New Rules for Classification of Employees

New rules governing the classification of employees for statistical and reporting purposes, to go into effect on July 1, have been issued by the Interstate Commerce Commission. They provide for more detailed reports than have hitherto been required. The resulting statistics are intended to meet the needs of both the Railroad Labor Board and the Interstate Commerce Commission. The classification is made largely in accordance with the recommendations of the director-general of railroads. It is requested that duplicate copies of the reports be sent to the Labor Board. There will be 148 classes of employees, in place of the 68 classes heretofore used by the commission. The number of employees is to be counted 12 times a year as of the 15th of the month, with additional counts for certain occupations.

New Acting Secretary Announced for A. S. C. E.

At the regular meeting of the American Society of Civil Engineers on May 4, notice was presented that E. M. Chandler, formerly chief engineer, Washington State Reclamation Service, Olympia, Wash., had been elected acting secretary of the society. Following this, Ernest E. Howard, Kansas City, Mo., presented a paper on Vertical Lift Bridges. With the aid of lantern slides, Mr. Howard presented and described the development of the lift bridge, the general elements of the design as well as going into considerable detail over the methods used in constructing some of the more notable of the structures illustrated. The greater part of the paper covered data relative to the design, etc., of the Columbia River Interstate bridge, the North Kansas City bridge and the Harriman bridge at Portland, Ore. The discussion was chiefly by D. B. Steinman and Shortridge Hardesty who compared the relative economies of the vertical lift bridge and the bascule span.

Cost of Train Operation in January

A further increase in the cost of train operation as indicated by selected accounts is shown by a statistical bulletin issued by the Interstate Commerce Commission for the month of January. The average cost per freight train mile for the selected accounts was $2.16 as compared with $1.87 in January, 1920, an increase of about 16 per cent. The cost of locomotive repairs increased from 45.7 to 54.8 cents, engine house expenses from 11 to 13.9, engine men from from 27.6 to 28.5, trainmen from 31.4 to 33.7, fuel from 60 to 73 and other locomotive and train supplies from 11.3 to 12.4 cents. The cost of coal per net ton, including freight, was $4.61 as compared with $3.71. The average cost of train operation per 1,000 gross ton miles was $1.59 as compared with $1.41. The cost per passenger train mile, selected accounts, was $1.16 as compared with $1.01.

March Income Shows Some Improvement

A preliminary compilation of revenues and expenses as reported by the railroads to the Interstate Commerce Commission for the month of March makes a better showing than that for the preceding three months. As the result of a considerable reduction in operating expenses, which show a decrease of 5 per cent as compared with March, 1920, 181 Class I roads show a net operating income for the month amounting to $28,000,000, as compared with $12,000,000 for the corresponding month of last year. To receive a 6 per cent return for the year the Class I roads should earn about $81,000,000 net in March, but in January and February the roads had deficits and in December the net operating income was only about $10,000,000. Total operating revenues of the 181 roads for March were $434,000,000, or almost exactly the same as those for March, 1920. Operating expenses were $380,000,000, a reduction of $20,000,000. The more detailed statement which will be issued later is expected to show, however, that this reduction was accomplished largely at the expense of maintenance. The Eastern roads had a net operating income of $10,000,000, the Southern roads $7,000,000 and the Western roads $10,600,000.

Opposition to Sale of Chicago Junction

Luther M. Walter, attorney for eight railroads, opposing the purchase of the Chicago Junction belt line by the New York Central, sent a letter to the shippers along the Belt Lines on April 26, urging them to write to the Interstate Commerce Commission to the effect that they preferred to have the property remain under is present ownership, management and operation, since learning the facts regarding the present financial condition of these properties. "When the New York Central entered into its agreement to buy the Belt Lines on September 27, 1920," said Mr. Walter in his letter, "the lines were in poor condition financially. However, substantial increases in allowances by all the connecting trunk lines have made possible sufficient revenues to adequately maintain and expand the property as well as to return a fair rate of interest on the investment." Mr. Walter stated that the trunk lines would continue the present rates and allowances that have made the increased revenues possible, would continue to absorb the present switching charges and would retain the present flat rates to and from industries.

Traffic and Operating Statistics for January

The net ton miles of revenue and non-revenue freight handled by the railroads in January, 1921, aggregated 29,817,000,000 as compared with 34,964,000,000 in January, 1920, a decrease of 14 per cent, according to the monthly statistical bulletin issued by the Interstate Commerce Commission, covering 169 Class I roads. The average carload for the month was 30.2 tons as compared with 28.3 in the corresponding month of 1920, and the average mileage per car per day was 23.2 as compared with 22.8. The average number of unserviceable cars was 8.7 as compared with 6.5.

The average haul of freight per railroad was 187.62 as compared with 182.10 in 1920, in spite of the increase in the rates. The average revenue per ton mile was 1.21 cents as compared with 0.969 in 1920.

The number of passengers carried one mile was 3,358,000,000 as compared with 3,501,000,000 and the revenue per passenger mile was 3.11 cents as compared with 2.61 cents. There was a slight increase in the average journey per road, from 35.95 to 35.99, but there was a decrease in the number of passengers per car from 18.66 to 17.19.

A. R. A. Committee for Coal Hearings

The board of directors of the American Railway Association announces the appointment of a committee of six railway officers to look out for the interests of member roads at the hearings which are to be given by the Interstate Commerce Commission in its investigation of the practices of railroads in the distribution of private cars used in coal traffic and cars used for railroad fuel. The commission is to conduct these hearings at a number of points in different parts of the country. The committee now appointed is to co-operate with Col. A. P. Thom, general counsel of the Association of Railway Executives. It consists of C. H. Markham (I. C.); F. H. Alfred (P. M.); H. E. Byram (C. M. & St. P.); Elisha Lee (Penn.); E. E. Loomis (L. V.) and W. D. Robb (G. T.).

This committee has appointed a committee of railroad counsel to handle the case in behalf of the members, as follows: R. V. Fletcher (I. C.); H. W. Bikle (Penn.); John C. Bills (P. M.); W. S. Bronson (C. & O.); E. G. Buckland (N. Y., N. H. & H.); K. F. Burgess (C. B. & Q.); H. T. Dick (C. & E. I.); O. W. Dynes (C., M. & St. P.); E. S. Jouett (L. & N.); J. G. McMurray (D. & R. G.); and Chas. J. Rixey (Southern).

A. G. Gutheim, of the car service division, A. R. A., is also associated with the committee.

A Full Day's Work for a Full Day's Pay

Francis H. Sisson, vice-president of the Guaranty Trust Company, New York city, speaking before the American Newspaper Publishers' Association at its annual convention last week, called the attention of farmers and other persons making insistent demands for freight rate reductions to the fact that the railroads, like every other institution, must have an income at least equal to their expenses. "Railroad rates are unquestionably too high in instances, not only for the wel-

fare of business generally, but also for the best interests of the railroads themselves. There they should be reduced. But the farmers and business men who are clamoring for a general readjustment of these rates to a pre-war basis should realize that they are demanding drastic action on the part of the Interstate Commerce Commission which would mean financial disaster to the railroads and eventually to the commerce of the country. Here is a striking instance of the lack of knowledge on the part of some of our people regarding one of the most vital domestic problems of the day. It should be patent to all that to reduce rates without first reducing railroad operating costs would be calamitous. Operating costs, however, cannot be materially curtailed so long as 63 per cent of railroad revenue is absorbed in wages, as contrasted with only 43 per cent in 1917. So, in the final analysis the farmers' quarrel is not with the railroad managements but with organized railroad labor, which is opposing a reduction in the largest item of operating cost and thereby penalizing the farmer and all other producing interests in the country. Instead of applying pressure on the Interstate Commerce Commission, the farmers should address themselves directly to the railroad brotherhoods and demand a deflation of unjustifiable war wages and a full day's work for a full day's pay.

Program for Annual Meeting of Mechanical Division A. R. A.

The Mechanical Division of the American Railway Association has issued a program for the business meeting to be held at the Drake Hotel, Chicago, June 15 and 16. The sessions will convene at 10:00 a. m., city time, which is 9:00 a. m., central standard time, and continue all of each day with luncheon period from 12:30 to 2:00 p. m.

Reports from the following committees will be considered:

WEDNESDAY, JUNE 15

General Committee.
Committee on Nominations.
Arbitration Committee.
Committee on Prices for Labor and Material.
Committee on Loading Rules.
Committee on Standard Method of Packing Journal Boxes.

THURSDAY, JUNE 16

Committee on Car Construction.
Committee on Brake Shoe and Brake Beam Equipment.
Committee on Train Brake and Signal Equipment.
Committee on Tank Cars.
Committee on Specifications and Tests for Materials.

Election of officers will be held Wednesday, immediately after report of Nominating Committee is presented. Advance copies of the reports to be considered will be mailed to the members before the meeting.

For Reasonable Railroad Regulation

The Chamber of Commerce of the United States, in resolutions adopted at its ninth annual meeting at Atlantic City, N. J., declared safe and adequate rail transportation, at the lowest rates consistent with fair wages to employees and with just returns to the owners and also sufficient to insure constant growth and improvement in facilities, to be essential to the upbuilding of the nation.

"Reasonable returns on fair value are necessary, not only as an act of justice, but also to attract new money for expansion, and to promote the safety of railway securities. Proper aggregate earnings must be maintained, but rates and the relation of rates between various commodities, particularly the products of agriculture, should be established with great care. In a country of great distances it is important for the farmer, the laborer and every producer and every consumer to have the widest distribution of commodities.

"The unrivaled railway system of the United States was created through the courage, energy, brains and money of individuals, . . . and the nation, speaking through the last Congress, decided that it wishes its railway system owned and operated by individual citizens, subject to regulation by Federal and State authority; and that it does not want government ownership or operation.

"The Chamber of Commerce of the United States reiterates its opposition to government ownership or operation. Regulation is reasonable only when it is not so restrictive as to cripple initiative and when it permits prompt action by those responsible for results. Unduly restrictive laws retard the railways rather than assist them and, in the long run, work in the direction of increased rather than reduced rates. . . ."

Railroad Regulation Gone Too Far

Otto H. Kahn, of New York, speaking before the Traffic Club of Pittsburgh on April 28, made a strong plea for such modification of federal control over railroads as shall give the directors of the companies adequate powers of initiative.

"I venture to hope—though I know it to be a daring hope," said Mr. Kahn, "that out of the investigation which shortly will be inaugurated by Senator Cummins' committee into the railroad situation there will come recognition that regulation and control have gone too far, and that more scope again must be allowed to the old American method of personal initiative, enterprise and responsibility, if the railroads are to be enabled to give the fullest and best measure of service to the people."

Mr. Kahn would continue a flat tax on corporate earnings, would abolish the excess profits tax, eliminate minor irksome and invidious special taxes and broaden the basis of indirect taxation. He would favor a sales tax, believing that the various practical objections brought forward by its opponents can all be met.

In speaking of the railroads, Mr. Kahn said:

"Practically nothing of any importance can be done without a hearing before the nine governmental appointees in Washington. Initiative has been blunted, vision deadened, daring rendered impossible, decision removed, the qualities of leadership dispossessed, men of commanding ability discouraged from entering the railroad field.

"The Interstate Commerce Commission is both an advantage and a necessity. But it should be entirely possible to attain both the things which I believe a majority of our people desire to see preserved: government surveillance and authority, and private initiative, resourcefulness, zest and responsibility. . . . It is greatly to be hoped that the bulk of employers will use the present emergency not to get even with labor, but to set an example of fair and considerate dealing."

Commission Asked to Amend Valuations

The Kansas City Southern and the Los Angeles & Salt Lake have filed motions with the Interstate Commerce Commission asking that the supplemental tentative valuations issued by the commission on March 31 be amended to set forth an analysis of the methods of valuation employed and the reasons for any difference between the final value found and the cost schedules or cost values stated by the commission. It is stated that the valuation act requires such an analysis of the methods and that the commission in failing to give it has not complied with the plain and express terms of the valuation act.

The Kansas City Southern motion states that the carrier is deprived of the right given by the valuation act to protest against the rules, principles, methods and procedure which have been employed and that it cannot prepare intelligently its protest against the supplemental tentative valuation. As an illustration, the carrier points to the fact that the value stated as the final value of the carrier is less than the cost of reproduction new as computed by the commission and in excess of the cost of reproduction less depreciation as computed by the commission, but it is nowhere stated by what method or processes such value has been reached. Objection is also made that there is no ascertainment of other values and elements of value and that the valuation does not give or purport to give the commercial or pecuniary value of the property. The final figure given is described as "an arbitrary and artificial sum determined by some undisclosed process and not a compliance with the law."

The Los Angeles & Salt Lake has also filed a protest against the supplemental tentative valuation stating that a valuation as of June 30, 1914, will not comply with the act or serve any purpose thereunder. Protest is also made against the finding of a final value of $45,871,093 and the company alleges that the value of its property was not less than $70,000,000. It is also

stated that the commission in finding a value "as that term is used in the interstate commerce act" has employed language which is indefinite and subject to misconstruction and misunderstanding, in view of the fact that there is an important controversy whether the value to be reported shall be "real or pecuniary value" or simply an amount to be designated as the value for rate-making purposes.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, Room 3014, 163 Broadway, New New York City. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—S. W. Derr, Philadelphia & Reading, Philadelphia, Pa.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 29 S. La Salle St., E. I. R. R., 332 South Michigan Ave., Chicago. Annual convention, May 9-11, La Fayette Hotel, Buffalo, N. Y.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 24-26, 1921, Kansas City, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamlin Ave., Chicago, Ill. Next convention September 12-14, Hotel Sherman, Chicago.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Next regular meeting, November 16, 1921.

Division I—Operating, W. J. Fripp (Chairman), General Manager, New York Central Railroad, Eastern Lines, New York, N. Y.; R. E. McCarty (Vice-Chairman), General Manager, Central Region, Pennsylvania System, Pittsburgh, Pa.

Freight Station Section (including former activities of American Association of Freight Agents), C. E. Fish (Chairman), Freight Agent, Baltimore & Ohio Railroad, Cincinnati, Ohio; J. C. Gilmore (First Vice-Chairman), Agent, Pennsylvania System, Eastern Region, Philadelphia, Pa.; C. M. Teschemacher (second Vice-Chairman), General Agent, Chicago & Alton Railroad, Chicago, Ill.; R. O. Wells (Secretary), Freight Agent, Illinois Central Railroad, Chicago, Ill.

Medical and Surgical Section, D. Z. Dunott (Chairman), Chief Surgeon, Western Maryland Railway, Baltimore, Md.; G. G. Dowdall (First Vice-Chairman), Chief Surgeon, Illinois Central Railroad, Chicago, Ill.; Duncan Eve (Second Vice-Chairman), Chief Surgeon, Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn. J. C. Caviston, secretary, 75 Church Street, New York. Annual meeting, June 3 and 4, Hotel Westminster, Boston.

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), R. S. Mitchell (Chairman), Chief Special Agent, Missouri Pacific Railroad, St. Louis, Mo.; H. L. Denton (First Vice-Chairman), General Superintendent of Police, Baltimore & Ohio Railroad, Baltimore, Md.; Emmett Gregg (Second Vice-Chairman), Superintendent Special service, Atchison, Topeka & Santa Fe Railway, Topeka, Kan.; J. C. Caviston (Secretary), 75 Church St., New York, N. Y.

Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents). H. Hulatt (Chairman), Manager of Telegraphs, Grand Trunk Railway, Montreal, Que.; W. H. Hall (First Vice-Chairman), General Superintendent of Telegraph, Missouri, Kansas & Texas Lines, Denison, Texas; R. F. Finley (Second Vice-Chairman), Superintendent Telegraph, New York Central Lines, West of Buffalo, Cleveland, Ohio; W. A. Fairbanks (Secretary), 75 Church St., New York, N. Y.

Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). E. J. Pearson (Chairman), President, New York, New Haven & Hartford Railroad, New Haven, Conn.; J. J. Bernet (Vice-Chairman), President, New York, Chicago & St. Louis Railroad, Cleveland, Ohio; C. W. Crawford (Chairman, General Committee), 431 South Dearborn St., Chicago, Ill.; G. W. Covert (Secretary), 431 South Dearborn St., Chicago, Ill.

Division III—Traffic, G. H. Ingalls (Chairman) Vice-President, New York Central Lines, New York, N. Y.; J. Gottschalk (Secretary), 143 Liberty St., New York, N. Y.

Division IV—Engineering, H. R. Safford (Chairman), Assistant to the President, Chicago, Burlington & Quincy Railroad, Chicago, Ill.; C. J. Kelloway (Vice-Chairman), Superintendent of Signals, Atlantic Coast Line Railroad, Wilmington, N. C.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill.

Construction and Maintenance Section, H. R. Safford (Chairman), Assistant to the President, Chicago, Burlington & Quincy Railroad, Chicago, Ill.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill.

Electrical Section, George Gibbs (Chairman), Chief Engineer of Electric Traction, Long Island Railroad, New York, N. Y.; E. B. Katte (Vice-Chairman), Chief Engineer Electric Traction, New York Central Railroad, New York, N. Y.; E. H. Fritich (Secretary), 431 South Dearborn St., Chicago, Ill.

Signal Section (including former activities of the Railway Signal Association), F. W. Pfleging (Chairman), Signal Engineer, Union Pacific Railroad, Omaha, Nebr.; F. B. Wiegand (First Vice-Chairman), Signal Engineer, New York Central, Railroad, Western Lines, Cleveland, Ohio; C. A. Christofferson (Second Vice-Chairman), Signal Engineer, Northern Pacific Railway, St. Paul, Minn.; H. S. Balliet (Secretary), 75 Church St., New York, N. Y. Annual meeting, June 6-8, Hotel Drake, Chicago.

Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association), W. J. Tollerton (Chairman), General Mechanical Superintendent, Chicago, Rock Island & Pacific Railway, Chicago, Ill.; J. Coleman (Vice-Chairman), Assistant to General Superintendent Motive Power and Car Departments, Grand Trunk Railway, Montreal, Que.; V. R. Hawthorne (Secretary), 431 South Dearborn St., Chicago, Ill. A business session at the Hotel Drake, Chicago, will be held on June 15 and 16, instead of the convention at Atlantic City, N. J. Exhibit at this convention of Railway Supply Manufacturers' Association has been cancelled.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association), E. L. Younger (Chairman), Foreman Painter, Missouri Pacific Railroad, Little Rock, Ark.; J. G. Keil (First Vice-Chairman), Foreman Painter, New York Central Railroad, Western Lines, Elkhart, Ind.; J. R. Ayers (Second Vice-Chairman), General Manager Painter, Canadian Pacific Railway, Montreal, Que.; V. R. Hawthorne (Secretary), 431 South Dearborn St., Chicago, Ill.; A. P. Dane (Assistant Secretary), Foreman Painter, Boston & Maine Railroad, Reading, Mass.

Division VI—Purchases and Stores (including former activities of the Railway Storekeepers' Association), H. C. Pearce (Chairman), General Purchasing Agent, Seaboard Air Line Railway, Norfolk, Va.; H. E. Ray (Vice-Chairman), General Storekeeper, Atchison, Topeka & Santa Fe Railway, Topeka, Kans.; J. P. Murphy (Secretary), General Storekeeper, New York Central Railroad, Western Lines, Collinwood, Ohio; W. J. Farrell (Assistant Secretary), 75 Church St., New York, N. Y. Second annual meeting June 9-11, Hotel Blackstone, Chicago.

Division VII—Freight Claims (including former activities of the Freight Claim Association), H. C. Pribble (Chairman), General Claim Agent, Atchison, Topeka & Santa Fe Railway System, Topeka, Kans.; H. C. Howe (First Vice-Chairman), Freight Claim Agent, Chicago & North Western Railway, Chicago, Ill.; D. C. MacDonald (Second Vice-Chairman), Assistant General Claim Agent, Canadian Pacific Railway, Winnipeg, Man.; Lewis Pilcher (Secretary) 431 South Dearborn St., Chicago, Ill. Next meeting, May 17-19, Hotel Sherman, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 Waller Ave., Austin Station, Chicago. Next convention, October 18-20, 1921, New York City. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Next convention, August 9-11, Hotel Sherman, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C. Next meeting, May 18, Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseman, 4600 Prospect Ave.; Cleveland, Ohio. Next convention, September 19-24, Indianapolis, Ind.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 20-24, New Monterey Hotel, Asbury Park, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Col. H. S. Crocker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Next convention, April 27, 1921, Houston, Texas. Regular meetings, 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next meeting, May 23-26, Congress Hotel, Chicago.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Pacific Ry., Spokane, Wash. Next convention, June 20, 1921, Kansas City, Mo.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting, May 18-20, at St. Louis, Mo.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division 2.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—A. J. Filkins, Paul Dickinson Company, Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 131 Charron St., Montreal, Que. Next meeting, April 12.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesian Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILWAY CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division 7.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Next convention, August 16-18, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May 24-26, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn. Next convention, September 12-15, Hotel Sherman, Chicago. Exhibit by Association of Railway Supply Men.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, October 4-6, 1921, Buffalo, N. Y.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next convention, which was scheduled to be held May 23-26, 1921, Planters' Hotel, St. Louis, Mo., has been deferred.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—(See American Railway Association, Division 5, Equipment Painting Section.)

MASTER CAR BUILDERS' ASSOCIATION.—(See American Railway Association, Division 5.)

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—E. E. Pershall, T. J. Moss Tie Company, 720 Security Bldg., St. Louis, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next annual convention, May 4-7, Cleveland, Ohio.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago. Meeting with American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Next annual meeting, June 8, 1921, Hotel Traymore, Atlantic City, N. J.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Americus Club House, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, American Arch Company, Inc., 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See American Railway Association, Division 4, Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See American Railway Association, Division 6.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Exhibit at June, 1921, convention of American Railway Association, Division 5—Mechanical, has been cancelled.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 20-22, 1921, Chicago. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION—F. W. Edmunds, Schroeder Headlight & Generator Co., New York City. Meeting with American Railway Association, Signal Section.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 117 East 98th St., Cleveland, Ohio. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Meeting third Monday each month except June, July and August.

Traffic News

The New York Central, beginning May 15, will place in effect a 30 per cent reduction in round trip passenger fares from Chicago to all Michigan resorts for the summer season.

The Illinois Central and the Nashville, Chattanooga & St. Louis have established new fast freight-train schedules from Chicago, St. Louis and points north and west to Atlanta, Ga., Jacksonville, Fla., Havana, Cuba, and other Georgia, Florida and Cuba destinations.

The portrait of the owner will be required on commutation tickets of the Long Island Railroad if the company carries out its conditional proposal announced last month in notices to passengers. These tickets are very frequently used wrongfully by persons who do not own them, and the company has appealed to all ticket holders to use their influence to stop this unlawful practice.

The San Diego & Arizona has completed arrangements with the Southern Pacific and with the Atchison, Topeka & Santa Fe for an interchange of passenger traffic at San Diego, Cal., on both one-way and round trip business, tariffs to become effective May 1. This will permit passengers from the east to travel over the San Diego & Arizona to San Diego and then to Los Angeles or San Francisco without extra cost.

The Southern Railway has established district claim offices under the direction of the following traffic officers: J. H. Drake, general freight agent for Virginia, North Carolina and the District of Columbia, with headquarters at Richmond, Va.; W. H. Paxton, general freight agent for Georgia, South Carolina and Florida, with headquarters at Atlanta, Ga.; W. C. Stephens, district freight agent, for Alabama, Tennessee and Mississippi, with headquarters at Chattanooga, Tenn.; K. B. Hannigan, general freight agent for Illinois, Indiana, Ohio and Kentucky, with headquarters at St. Louis, Mo.; J. B. Bannon, assistant general freight agent for the New Orleans & Northeastern for the territory between New Orleans and Meridian, Miss., with headquarters in the latter city.

An adjustment of rates on grain from Missouri river points to Chicago via Minneapolis is to be put into effect on May 15 with the authority of the Interstate Commerce Commission. A committee representing the carriers and shippers called on Chairman Clark of the commission on April 29 and suggested the making of a rate to apply through Minneapolis with transit at that point of 11 cents over the rate on direct routes from the Missouri river to Chicago. This represents a reduction in the rate, but it is stated it will give a larger revenue to the roads than if the same grain were shipped south through the Gulf ports. The proposed readjustment of export grain rates recommended by the commission as a modification of proposals made by the shippers and the carriers was put into effect by the Eastern roads on May 5.

Lake Cargo Coal Rates to Be Reduced

For the purpose of stimulating the movement of coal to the northwest, by water, in order to avoid congestion and car shortage later in the year, the railroads serving the lower lake ports have asked, and the Interstate Commerce Commission has granted, a sixth-section permission-order authorizing the publication on five days' notice of tariffs providing for a reduction of 28 cents a ton in the rates on coal shipped to the lower lake ports and trans-shipped across the lakes. The tariffs are to be in effect only until October 31, which is about the latest date when coal can leave the mines for lake shipment before the close of navigation. They require payment of the established rate, refund to be made on proof that the coal has been trans-shipped. They do not cover coal moving to Chicago or points south of the Illinois-Wisconsin line and the commission has received a large number of telegrams from shippers of Illinois and Indiana coal complaining of discrimination.

Senators Try to Reduce Rates

Senator Robinson of Arkansas has introduced in the Senate a bill to prevent increases in rates, fares, charges or classifications until approved by the Interstate Commerce Commission.

Numerous bills have been introduced by both Senators and Representatives authorizing and directing the Interstate Commerce Commission to issue interchangeable mileage books for 1,000 to 5,000 miles at reductions from 20 to 33⅓ per cent from the established rates.

Senator Trammell of Florida has introduced a bill in the Senate to repeal Section 15-a of the act to regulate commerce, which contains the 5½ to 6 per cent rule of rate-making.

Construction Material Interests Ask Reduction in Freight Rates

Representatives of the industries interested in road-building and construction materials that have been urging the President and the Interstate Commerce Commission to assist them in getting a reduction in freight rates have arranged for a conference at Washington on May 13 with representatives of the railway executives and the Interstate Commerce Commission to discuss the subject. A meeting was arranged with President Willard of the Baltimore & Ohio, who agreed to such a conference with the understanding that representatives of both sides in interest be prepared to discuss the matter in its broadest aspects and with a spirit of co-operation. He stated that he doubted if much would be accomplished by such a conference if the discussion were confined merely to the matter of railway rates. A delegation of representatives of the construction and road-building interests urged a reduction in freight rates at a conference with President Harding on April 29, at which they presented a memorial stating that the situation is urgent and can not await the ordinary process of appeal for relief through the Interstate Commerce Commission. It was stated that the chief cause of deferment in building work is excessive freight rates applying on that class of materials which are heavy loading and of no value and that freight rates on buildings and road materials have increased an average of 110 per cent since 1917, or far beyond the point the traffic will bear. It is understood that Chairman Clark asked whether the producers would be willing to reduce prices and was told that such steps would be considered provided the railroads would cut rates.

Average Revenue Per Ton and Per Passenger Per Mile

The average revenue received by the railroads of the United States for transporting a ton of freight one mile is less under the present rates than it was during the period before the creation of the Interstate Commerce Commission, according to a compilation just made by the Bureau of Railway Economics comparing the statistics for the years 1882 to 1887, reported in Poor's Manual of Railroads, with those reported by the Interstate Commerce Commission for the years since. In 1882, according to Poor's Manual, the average receipts per ton mile were 1.23 cents. In 1920, according to the Interstate Commerce Commission, the average was 1.05 cents. The latest increase in freight rates, however, was in effect for only the last four months of 1920. For January, 1921, the average receipts of the railroads for hauling a ton one mile were 1.21 cents. In 1887, the year of the organization of the Interstate Commerce Commission, the average was 1.6 cents and there was a steady reduction until 1916, when the average was 7.7 mills per ton mile. There has been an increase in each year since 1916; in 1917 to 7.15 mills, in 1918 to 8.49 mills and in 1919 to 9.73 mills. The average receipts per ton mile are affected by other factors than changes in the freight rates, notably by changes in the character of the tariff which make an increase or decrease in the proportion of commodities which pay a lower rate than others, but the average receipts afford the best general index of the trend of rates.

The average receipts per passenger per mile, however, are now slightly higher than they were before 1887. In 1882 the average was 2½ cents and in 1887 it was 2.27 cents. In January, 1921, the average was 3.11 cents and for the year 1920 the average was 2.74 cents. Passenger revenues per mile reached their lowest point in 1909 when the average was 1.92 cents. In 1916 the average was 2.4 cents, in 1918 it was 2.41 cents and in 1919 it was 2.54 cents.

Commission and Court News

Interstate Commerce Commission

Conferences will be held at Yakima, Wash,. and Boise, Idaho, in addition to those previously announced, on rates on fruits and vegetables; at Yakima on May 10, and at Boise on May 14. The Denver conference has been postponed to May 19.

The commission has further suspended until June 24, the operation of certain increased rates on glass fruit jars, etc., from Sand Springs, Sapulpa and other points in Oklahoma and Texas, to Memphis, Tenn., and points taking same rates.

The commission has further suspended until June 14, the operation of certain reduced class and commodity rates from New York, Philadelphia and other points to Houston and Galveston, Texas, via water and rail, or rail, water and rail lines.

The commission has suspended until August 29 the operation of certain schedules published in supplements to Louisville & Nashville tariffs which propose increased commodity rates on rough, sawed or dressed stone, carloads, from Bowling Green, Ky., to eastern points, Ohio River crossings, St. Louis, Mo., Memphis, Tenn., New Orleans, La., Birmingham, Ala., etc.

Suspension Procedure

The Commission has issued a public notice outlining the main points of its rules of practice concerning suspension of proposed rates under Section 15 of the interstate commerce act as amended. It says:

The statutory maximum period of suspension is 120 days beyond the time when the rate would otherwise go into effect. It is therefore important that in such proceedings there be no unnecessary delay.

Before filing changes in rates the carriers should have considered the action, the reasons underlying it and the effects of it so thoroughly as to be prepared in case the changes are protested to immediately present in full their defense. They should also, as requested in the commission's circular letter of February 9, 1915, send with each schedule containing increased rates, a statement of the changes and the reasons therefor. A similar statement should be submitted with each schedule containing reduced rates as to which there is reasonable ground to believe that protests may be filed.

Suspension of proposed rates should not be requested unless protestant is sure that he understands the effect of the rates and that his request rests on good grounds. The request should state clearly and concisely the reasons relied upon in support thereof. The one who requests suspension should at the same time send direct to the carrier or the tariff agent who issued the tariff advice that request for suspension has been filed, and of the reasons for that action. The request upon the commission should be accompanied by a statement that the carrier or agent, naming them, has been so advised. If the carrier or tariff agent makes answer to protestant's petition, a copy of such answer must be sent by the carrier direct to the protestant at the same time that it is forwarded to the commission.

If the protestant desires to be heard orally by the suspension board, the request for suspension should so state and be filed with the commission at least 15 days prior to the effective date of the tariff.

The commission must determine its action upon a request for suspension in the light of understanding of the situation. In order that opportunity may be had for such understanding it is important that the request shall be filed as far in advance of the effective date of the rate as is practicable and not less than 10 days before that effective date. See Rule XIX of the commission's rules of practice. It will be the policy of the commission to afford carriers an opportunity to answer or explain allegations or questions raised in a request for suspension, but it is essential that the carriers shall give immediate attention to such matters and forward at once such representations as they desire to have considered. If the request for suspension is not presented within the time above mentioned it may ordinarily be expected that it will not be favorably acted upon. If the carrier's neglect to promptly forward the data which they desire to have considered in answer to a request for suspension they may expect that it will be unavailing. It will be the purpose of the commission to avoid suspending proposed rates except where the date of that action affords opportunity to publish notice of such suspension before the effective date of the proposed rates.

Personnel of Commissions

Ira B. Mills, chairman of the Minnesota Railroad and Warehouse Commission, and a former president of the National Association of Railroad and Public Utility Commissioners, died at St. Paul on May 4 at the age of 70. Judge Mills had been in office about 28 years.

The Senate on May 3 confirmed the appointments of E. I. Lewis and J. B. Campbell as members of the Interstate Commerce Commission. These appointments fill the remaining vacancies on the commission and it now has 11 members for the first time since the law was passed a year ago, increasing the number from 9 to 11.

Johnston B. Campbell, of Spokane, Wash., who has been nominated a member of the Interstate Commerce Commission, as noted in the *Railway Age* of April 29, was born in Stillwater, Minn., and his first twenty-one years were spent on a farm. He was graduated from the University of Minnesota in 1890 and was engaged in the practice of law in Duluth, Minn., for the next eight years. In 1898 he moved to Moorhead, Minn., but he soon moved from there to the State of Washington and for a time was engaged in farming; but in 1903 he began the practice of law in Spokane. Here he was the prime mover in the establishment of the Spokane Merchants' Association, and he has been the attorney and secretary of the association ever since. The management of the "Spokane rate case," in which for twenty or thirty years the merchants of that region have been contesting the long-and-short-haul provisions of the Interstate Commerce law, under which the freight rates from the east are higher to Spokane than to the Pacific Coast, has been carried on largely under his direction. Mr. Campbell has devoted most of his time to transportation matters since 1910, and during the period of government operation of the railroads he was a member of the Portland District Freight Traffic Committee.

J. B. Campbell

State Commissions

The State Railroad Commission of California, on April 13, ordered a reduction of more than 25 per cent in freight rates on the Atchison, Topeka & Santa Fe, and the Southern California between Los Angeles and Palo Verde valley points.

A petition has been filed with the Illinois Public Utilities Commission by the village of Oak Park, Ill., asking that the Aurora, Elgin & Chicago and the Baltimore & Ohio Chicago Terminal be compelled to elevate their tracks through the town. The cost of this work has been estimated by the Commissioner of Public Works of Oak Park at $1,600,000. The hearing was set for May 12.

The Michigan Public Utilities Commission on April 23 ordered all carriers in Michigan to reduce by May 10th freight rates for the transportation of sand, gravel and stone 25 per cent in the lower peninsula and 22 per cent in the upper peninsula. This order does not affect the rates on these materials where the sand is to be used in foundries or in the manufacture of glass, fertilizer, chemicals or cement, it being the purpose of the order to reduce rates on materials to be used in road construction.

The New York State Public Service Commission, second district, has denied the application of the Erie Railroad for permission to discontinue the services of an agent at a number of small stations in the western part of the state. It seems to the commission "that an impoverishment of the ordinary service of the company to the extent here proposed is a device pregnant with most grave and perhaps fatal results. It is difficult to see how any ultimate good can inure to the benefit of the investors in these properties by a deletion of the service to a point where it is unjust, unreasonable and inadequate."

The Public Utilities Commission of Utah has granted a certificate of convenience and of necessity for the operation of an automobile freight line between Salt Lake and Ogden, 37 miles, although there are two steam railroads and an electric line already serving this territory. The application of the proprietors of the automobile line has been pending since last August, strong protest having been made by the Oregon Short Line and the electric road. It appears that these automobiles have already done considerable business over this line and their application is endorsed by numerous business men in both cities. The commission requires tariffs to be filed and also a time table; and suggests that warehouses and other facilities will be needed. The commissioners expect that their order will give stability to a useful service now done outside of any regulatory law.

The move to abolish the railroad commission of the state of Wisconsin and substitute in its stead a utility commission of three members was reported unfavorably by the transportation committee in joint session with the Senate corporation committee at Madison, Wis., on April 27. This provision was incorporated in the Peterson utility bill and provided further that earnings of utilities in excess of 8 per cent on the investment should go into a sinking fund instead of being divided among stockholders. The committee agreed that the provision calling for the abolition of the present railroad commission in the Peterson utility bill should be removed from the bill and agreed to accept an amendment to be drawn by Louis E. Gettle, recent nominee as a member of the commission, altering the section which would govern the earnings of the utilities. In this form the bill will be recommended for passage.

Court News

Safety Appliance and Boiler Inspection Acts

The Minnesota Supreme Court holds that the presence of a piece of coal upon a step leading to a locomotive cab does not constitute a violation of the federal Safety Appliance Act; nor does the federal Boiler Inspection Act guarantee the employee against such obstruction. The court thinks both acts must be construed so as not to include cases where some foreign substance has found a temporary lodgment upon the appliances of the locomotive or tender, and which is not the result of the ordinary use of such instrumentalities, but came there accidentally from some unforeseen cause.—Reeves v. C. St. P. M. & O. (Minn.), 179 N. W., 689

Contract to Give Notice of Injury Held Void

The Texas Commission of Appeals holds that under section 5 of the federal Employers' Liability Act, declaring void any contract or rule to exempt a common carrier from any liability created by the act, a contract by which an interstate railroad employee agrees to give notice of injury and claim for damages within 30 days, failing which his cause of action would be barred, is void. So far as the court could find the only prior case on this point is Rock Island v. Pearce, 118 Ark. 6 (1915) where a similar contract was held void under the act. The Supreme Court of the United States has had no opportunity to review that decision, and no federal court appears to have had such a contract before it for construction.—Panhandle & Santa Fe v. Brooks (Tex.) 222 S. W., 186.

Assumption of Risk of Dangerous Duty

A member of a train crew was, in the course of a well-known dangerous yard movement, stationed on the front of a caboose pushed by the engine, with a duty to signal the engineer in time for him to stop if a derail should be found set against further passage. It was so set, but either through the negligence of the trainman himself or of the engineer in not noticing or heeding his signaling, the latter did not stop in time, the caboose was derailed, and the trainman was crushed to death between it and cars on the adjoining track. In an action under the federal Employers' Liability Act the Pennsylvania Supreme Court, assuming for the purpose of decision that the negligence was that of the engineer and not of the trainman, held that the latter assumed the risk of injury or death as a result of the movement, so that no recovery could be had therefor under the act.—Reed v. Director General of Railroads (Pa.), 110 Atl., 254.

Foreign Railway News

Training Plans on English Railway

The Great Western Railway of England has announced a training plan for salaried employees which involves a period of four years, during which time the employees who are selected to take the course will be taken from their regular duties and assigned for a brief period to work in each of several of the company's departments. In this manner the selected employees will be given an opportunity to observe the workings of as large a number as possible of the railway's various departments. It is contemplated that each selected employee will spend at least a year in the general offices of the company. Candidates for appointment to these courses must be recommended by the heads of their departments or by the division or district officers. No application is to be considered from any employee who does not hold a merit certificate in the company's examinations in either signaling or station accounts or who has attended a course of lectures and gained a first class certificate at one of the schools where educational facilities are provided by the company. The actual selection of the candidates and the observation of their progress in their studies will be in the hands of a committee made up of a number of general officers. The proposal does not carry any promise of preferment in promotions to those who are selected for this course.

England Escapes a Railway Strike

LONDON.

What threatened to be a general strike of all transport workers, including all classes of railway transportation employees, has been averted by what may be called a freak of fortune. The miners' union, which went out on a strike on April 1 on account of the drastic reductions in wages made necessary by the decontrol of the mines by the government, succeeded in gaining the support of the National Union of Railwaymen and the Transport Workers, who threatened a sympathetic strike to take effect on Friday, April 15. The chief argument for this co-operation by the railway union was that what the mine owners were trying to do to the miners the railway owners would try to do to the railwaymen when the railways were handed back to their owners on August 31, and that every support must be given the miners. From the time the strike announcement was made—April 9—until the date for which the strike was set, there were marked evidences of a lack of support in the ranks of the railway men. When the miners refused to consider what appeared to everyone, including the railwaymen, a fair proposal, which was suggested unofficially by the secretary of the miners' union, for reopening negotiations with the mine owners, the leaders of the railwaymen's union broke away and declared the strike off, no longer than five hours before the strike was to have taken effect. The miners are still holding out for a national wage board and the pooling of receipts for a uniform wage scale throughout the country.

Railway Operations in South Africa

The annual report of the general manager of the South African Railways and Harbors for the fiscal year ending March 21, 1920, shows a total route mileage of 9,541 for the South African Railways. In addition 1,285 miles of railway in the Southwest African Protectorate and 651 miles of privately operated lines are included under the administration. Of the 9,541 miles in the Union of South Africa, 154 miles are double tracked, 2 miles are three tracked and 12 miles are four track lines. None of the lines are of standard gage. Of 3 ft. 6 in. gage there are 8,981 miles and of 2 ft. gage 561 miles. No new lines were built during the year. The total capital investment at the end of the fiscal year was $470,598,942 (£ to $ at par) and the deficit after the payment of interest was $2,721,318. The general manager complains in his report of unsatisfactory financial agreements existing between his and other government departments which he says cost his administration some $3,645,000 per annum, or more than the deficit for the year.

The operating revenues of the railways totaled $93,165,160, an increase of 25 per cent over the previous year. Operating expenses amounted to $73,512,375, an increase of 29 per cent. Of the total revenues, 43 per cent were derived from merchandise and mineral traffic, 28 per cent from passenger traffic and 19 per cent from coal traffic. The annual wages bill increased $30,982,500 over the same total for the fiscal year 1911-12. Freight train mileage for the year was 19,730,700; passenger train mileage was 6,247,389 and mixed train mileage was 5,330,069. Total train mileage increased 8 per cent over the previous year.

Japanese Railway Statistics

A statement covering the operating statistics of the Imperial Government Railways of Japan has just been released for the year ended March 31, 1919. This statement has been summarized by the Bureau of Railway Economics. The statistics represent approximately four-fifths of the total railway mileage of the country, the remaining one-fifth consisting of minor privately owned lines and light railways. The miles of single track operated in 1919 were 5,269 as against 5,206 in 1918, and the total miles of all track operated were 9,503 as against 9,313. Capitalization in 1919 amounted to $636,836,513 as compared with $593,171,996 in 1918.

The statistics show that the freight traffic on the Japanese government railways in 1919 increased by 9.4 per cent when compared with 1918, or 59,711,366 tons as compared with 54,603,406; the number of passengers carried increased by 17.5 per cent or 288,061,584 as compared with 245,234,480. The revenue derived from freight service amounted to $54,707,599, while passenger earnings were $59,769,956. Total earnings in 1918 were $121,408,327, against $91,487,284 in 1918. Operating expenses in 1919 were $71,834,690, and in 1918 $42,058,458. The increase of $29,921,043 in revenues was thus offset by the increase of $29,776,232 in expenses, the net operating revenue remaining nearly stationary. Interest charges amounted to $21,097,112, additional works expenses $6,019,889, and subsidies to private light railways $747,750, leaving a net profit of $23,632,908 in 1919 as compared with a profit of $23,272,534 in 1918.

American Firm Secures Contract for Construction in Bolivia

A contract has been signed between the Bolivian government and an American firm for the financing and construction of the railway from La Quiaca, on the Argentine border, to Atocha, Bolivia, a distance of 126 miles, the only link needed to give La Paz, Bolivia, an all-rail route to Buenos Aires, Argentina, according to Vice-Consul Nelson at La Paz. The company engages to negotiate a loan of $7,000,000 in favor of the Bolivian government to cover the expense of construction and equipment of this railroad, and to complete the road by August 1, 1925. As the work progresses completed sections of 6 miles are to be turned over to the Bolivian government. Some work has already been done on the projected line, through previous contracts made with the Bolivian government by a French company, and in June, 1920, by an Argentine firm; however, both of these contracts were annulled for nonfulfillment. It is understood that 30 miles of the railway from La Quiaca are ready for the laying of the rails and that other parts of the La Quiaca-Tupiza section, 62 miles long, are also under construction. The Tupiza-Atocha section, 64 miles in length, has not yet been started. Total expenditures on the entire La Quiaca-Atocha line up to November 25, 1920, principally payments to previous contractors, have been approximately $1,818,700 (bolivianos to dollars at par).

The construction of this line will mark the completion of the second trans-Andean railway in South America, the other being the railway connecting Valparaiso and Santiago, Chile, with Buenos Aires, Argentina. The latter line, however, is not serviceable for several weeks in the year on account of severe snowstorms and snowslides which occur occasionally on the route, whereas the La Quiaca-Atocha line will be serviceable all the year round. By means of this new railway the trip from New York to Buenos Aires via Arica or Mellendo, Chile, can be made in 18 days, and by way of Antofagasta, Chile, in 19 days.

Equipment and Supplies

Car Deliveries in March

The number of freight cars delivered in March by the 27 car building companies reporting to the Railway Car Manufacturers' Association totaled 5,753 for domestic service and 700 for export. The passenger train cars delivered totaled 69 for domestic service. On March 31 the companies had on hand undelivered orders for 21,808 freight and 681 passenger cars for domestic service and 4,029 freight and 28 passenger cars for export. The detailed figures for the month follow:

NEW CARS DELIVERED

	Domestic	Foreign
Freight	5,753	700
Passenger	69	0

ON ORDER AND UNDELIVERED

			Total
Freight	21,808	4,029	25,837
Passenger	681	28	709

CAR REPAIRS

Delivered—March	4,824
On order and undelivered March 21	14,348

Locomotives

The SAO PAULO & RIO GRANDE (Brazil) is inquiring for 10 Mikado type locomotives.

PEKIN-KALGAN.—The American Locomotive Company has been given an order for 42 locomotives of the Pacific, Mikado and Mallet types for the Pekin-Kalgan Railway, China. The total value of the contract is in the neighborhood of $2,600,000. The Pekin-Kalgan is owned by the Chinese Government, and the payment for these locomotives is financed jointly by the American Locomotive Company and Mitsui & Co. The latter company is to pay to the locomotive company 50 per cent cash upon completion of the contract, and the remaining 50 per cent is to be paid in eight semi-annual payments. This order in value is one of the largest single orders placed by the Chinese government in the United States. Of the 42 engines there will probably be seven to ten Mallet type locomotives which will be the largest ever shipped out of the United States or in use in any other part of the world except the United States. Each locomotive and tender will weigh 640,000 lb. in working order.

Freight Cars

PERIN & MARSHALL, 1107 Broadway, New York, are inquiring for 60 all steel gondola cars, for export to India.

The SAO PAULO & RIO GRANDE (Brazil) is inquiring for 75 general freight, 25 open high side cars and 75 flat cars.

The PITTSBURGH & WEST VIRGINIAN is asking for prices on repairs to 500, 70-ton coal cars.

Passenger Cars

THE DELAWARE & HUDSON. is inquiring for 12 milk cars.

THE SAO PAULO & RIO GRANDE (Brazil) reported the *Railway Age* of April 22, as inquiring through the car builders for some passenger train equipment, is asking for 6 first-class and 6 second-class coaches, also 8 baggage, 4 mail and 4 sleeping cars.

Machinery and Tools

The NEW YORK CENTRAL will receive bids, until 12 o'clock noon, May 16, for the manufacture, delivery and erection in complete working condition, of one 1,500 kw. direct current geared turbine generator, to be installed in the turbo-generator building, Grand Central Terminal, New York City, and the removal of the existing turbine generator located at the same place.

Miscellaneous

The CHICAGO, ROCK ISLAND & PACIFIC has ordered 8,000 tons of tie plates from The Railroad Supply Company, Chicago.

The SOUTHERN PACIFIC COMPANY will receive bids at 165 Broadway, New York, until 12 o'clock noon, May 20, for one year's requirements of calcium carbide, which will approximate a minimum of 1,451,000 lb. and a maximum of 1,919,000 lb.

THE LEHIGH & NEW ENGLAND will receive bids at Philadelphia, Pa., until 12 o'clock noon, May 16, for its requirements estimated at approximately 32,000 gross tons of No. 1 buckwheat anthracite coal to be delivered at Pen Argyl, Pa.; 15,000 gross tons of No. 1 buckwheat anthracite coal to be delivered at Lansford, Pa., and 150 gross tons chestnut coal to be delivered at Pen Argyl, Pa.

THE LONG ISLAND is asking for bids until 12 o'clock noon, May 12, for 340-360 wooden barrels of 150 deg. kerosene oil for headlights; 50-60 wooden barrels of long time burning oil for use in lamps controlled by the signal department; 20-30 wooden barrels 300 deg. of mineral seal oil; 175-200 steel barrels motor gasoline; 5 cars or about 35,000 gal. gas oil, for making Pintsch gas for cars; 25,000 gal. roadbed oil for laying the dust on tracks.

THE NORFOLK & WESTERN will receive bids at Roanoke, Va., until 12 o'clock noon, May 11, for 2 100-lb. crossings; 1 100-lb. manganese steel crossing; 4 switchboard panels; 2,000 socket terminals for 130-lb. rail bond; 2,000 7/16-in. steel expansion pins; 2 steel gates; 4 steel gate posts; electrical material; 5,000 No. 2 B. & S. gage copper rail bonds; 650 lb. flux rods; 6 clamps for holding bonds to rail, and 400 D bevel steel bars ⅜-in by 3⅛-in by 20 ft.

Railway Construction

CENTRAL OF GEORGIA.—This company has awarded a contract to the Wright-Nave Company, Ashville, N. C., for the construction of 7 miles of branch line and about 1 mile of mine spurs. The branch line will run in a southeasterly direction from McCombs Station, Ala. The grading will average about 40,000 sq. yds. per mile. There will be no important structures on the new line and coal will be the principal commodity handled.

CHICAGO, GREAT WESTERN.—This company will close bids on May 11, for the construction of a new passenger station at Afton Junction, Iowa, to cost about $8,000.

CHICAGO, ROCK ISLAND & PACIFIC.—This company closed bids for the construction of a 500-ton frame coaling station at Morris, Ill., on May 3.

CHICAGO UNION STATION.—This company will shortly accept bids for the completion of the filled portion of the Polk street viaduct, Chicago, at a cost of about $12,000.

GRAND TRUNK.—This company is reconstructing its bridge over the Beauharnois canal near Cecile Junction, Que., at an expenditure of approximately $70,000. The company is also adding a roadway and side walk to its international bridge at Black Rock, N. Y., involving the expenditure of $40,500.

ILLINOIS CENTRAL.—This company will shortly accept bids for the construction of additions to its roundhouses at Waterloo, Iowa, and Freeport, Ill.

KENTUCKY AND TENNESSEE.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a branch line in McCreary County, Kentucky, a distance of 9,230 feet, to reach a tract of coal land.

LOUISIANA & ARKANSAS.—This company is preparing plans for the construction of a machine shop and other buildings at Stamps, Ark., and will soon be ready to accept bids on the work.

PITTSBURGH & WEST VIRGINIA.—This company contemplates the construction of a branch line, 3½ miles in length, running north from Virginia Station, W. Va. The grading on this line will be done under contract.

UNION PACIFIC.—This company will close bids on May 5, for the construction of a two-story, interlocking tower, with dimensions of 16 ft. by 20 ft., at Council Bluffs, Iowa, to cost approximately $12,000.

Supply Trade News

Moore, Cameron & Hill, Limited, has removed its Montreal, Que., office from 284 Beaver Hall Hill to 205 Drummond building.

The Blackburn-Smith Corporation has removed its office from 105 West Fortieth street to the Terminal building, 103 Park avenue, New York City.

The Dutilh-Smith McMillan Company, Inc., and **Lam, Glines & Co., Inc.,** have removed their offices from 50 Broad street to 40 West street, New York City.

The Ryan Car Company will move its Chicago office from the McCormick building, 332 South Michigan boulevard, to the Fisher building, 343 South Dearborn street, on May 1.

John J. Swan, for the past two years with the Prest-O-Lite Company at Indianapolis, Ind., has resigned to become associated with the **Engineering Business Exchange,** New York city.

J. M. Davis, formerly vice-president of the Baltimore & Ohio, has been elected president of **Manning, Maxwell & Moore, Inc.,** 119 West Fortieth street, New York City, to succeed the late A. J. Babcock. Mr. Davis was born on November 5, 1871, and began railway work in 1888, as a freight brakeman on the San Antonio & Aransas Pass. From September, 1891, to 1900, he served consecutively as stenographer to the superintendent of the Gulf, Colorado & Santa Fe, chief clerk to the superintendent of the Mexican Central, clerk in the general manager's office of the Great Northern, assistant superintendent and later superintendent of the Great Northern. In 1900, he went to the Erie as superintendent at Scranton, Pa., subsequently serving as superintendent of the Union Steamboat Line of the Erie, at Buffalo, N. Y., and as superintendent of the Allegheny division of the Erie. He returned to the Great Northern in 1903, as superintendent, and in 1905 was promoted to assistant general superintendent of the Central district. In 1907 he went to the Oregon Short Line as assistant general superintendent, and was subsequently made acting general superintendent and later general superintendent. In 1910 he was appointed general superintendent of the Central district of the Southern Pacific, with headquarters at San Francisco, Cal. He entered the service of the Baltimore & Ohio on January 1, 1914, as assistant general manager at Cincinnati, Ohio, of the Baltimore & Ohio Southwestern-Cincinnati, Hamilton & Dayton, and later in the same year was promoted to general manager of these lines. In July, 1916, he was appointed vice-president in charge of operation and maintenance of the Baltimore & Ohio System, with headquarters at Baltimore, Md., and held that position until July 1, 1918, when, under federal control of the railroads, he was appointed manager of the New York properties of the Baltimore & Ohio, including the Staten Island lines. In September, 1919, he left the Baltimore & Ohio to become president of the Rock Hill Iron & Coal Company and associated corporations, including the East Broad Top Railroad & Coal Company, with office at New York.

J. M. Davis

The H. K. Ferguson Company, Cleveland, Ohio, has removed its Chicago office from the Rookery building to 1637 Monadnock Block. **O. C. F. Randolph** remains in charge of the Chicago territory.

The Ross Heater & Manufacturing Company, Inc., Buffalo, N. Y., has opened a branch office at 2 Rector street, New York City, and has discontinued its sales agency. The new office is in charge of **C. M. Hardin,** who was formerly located at the home office.

The Automatic Coupler & Trailer Equipment Company, 954 West Twenty-first street, Chicago, has been incorporated with a capital of $100,000, by **Norman T. Brenner, Meyer B. Mervis** and **Charles A. Holland,** to manufacture railroad and other heavy mechanical equipment.

R. L. Shepard, until recently engaged in railroad sales promotion work for the **Burroughs Adding Machine Company,** Detroit, Mich., is now handling railroad sales for that company in Chicago. Mr. Shepard was formerly connected with the Union Pacific Railroad at Omaha.

Mark R. Briney, eastern manager of the **Federal Signal Company,** in charge of sales and installations in that district, has been appointed sales manager, with headquarters at 52 Vanderbilt avenue, New York City, effective May 1. Mr. Briney will have charge of all railway signaling sales and installations, both domestic and foreign, and his jurisdiction will extend over all branch offices, agencies and the commercial end of the business. **J. J. Hubbard,** formerly in charge of installations, has been appointed resident manager of the company, effective May 1. Mr. Hubbard will have charge of sales and installations in the eastern district, with offices as above.

Pittsburgh Base on Steel Products Opposed

The Federal Trade Commission on April 29 issued a formal complaint against the United States Steel Corporation and 11 subsidiary companies, upon application of the Western Association of Rolled Steel Consumers and other users of steel products, on the ground that the Pittsburgh basing point system of basing the prices of steel products except rails on the price at Pittsburgh plus the freight rate from that point to destination constitutes an unfair method of competition in violation of Section 5 of the organic act of the commission and Section 2 of the Clayton Act. The case was set for hearing on May 31 or as soon thereafter as it is reached on the docket. The complaint alleges that this price practice makes it impossible for purchasers of rolled steel to secure the product from any manufacturers at prices substantially different from those contained in the price schedules issued by the corporation.

Obituary

Ambrose Monell, for 15 years previous to 1917 president of the **International Nickel Company,** New York, and during the war a colonel in the aviation section of the A. E. F., died on May 2, at Beacon, N. Y., at the age of 47. Colonel Monell was born in New York City and was graduated from Columbia University with the class of 1896. After leaving Columbia, he went to the Carnegie Steel Company, Pittsburgh, as a metallurgical engineer, serving for six years in various capacities until he became assistant to the president. Later he became president of the International Nickel Company. Mr. Monell was a director of a number of companies, including the Haskell & Barker Car Company, the Air Reduction Company and the International Nickel Company.

Trade Publications

SPREADER PLOW.—The Bucyrus Company, South Milwaukee, Wis., has issued Bulletin SP—502 describing its Class 50 spreader plow. This eight-page booklet describes the machine and illustrates its appearance and the character of work performed. Information and a drawing are also given of a method of making a 31-ft. fill with the plow, without the use of trestle work.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—*Annual Report.*—A review of this company's annual report appears on another page of this issue.

New Directors.—John W. Davis and W. C. Potter, both of New York, have been elected directors to succeed E. J. Engel of Chicago, and F. L. Julliard, of New York.

BANGOR & AROOSTOCK.—*Annual Report.*—The income account for the year ended December 31, 1920, compares with 1919 as follows:

	1920	1919
Rental from U. S. Railroad Administration entire year 1919, and January and February, 1920	$231,789	$1,555,775
March 1, 1920, to August 31, guaranty from U. S. Government as per contract; due from the U. S. Government account net income being less than guaranty, difference	448,994	.....
Rail operations—revenues March 1 to December 31	*5,786,756	.....
Less rail operations—expenses	5,030,406	34,594
	$756,350	$1,521,182
Compensation and net operating revenues	1,437,133	1,521,182
Other income	397,045	72,303
Gross income	$1,834,179	$1,593,484
Railway tax accruals	286,561	42,171
Interest on funded debt and other deductions	997,251	1,077,724
Total deductions	$1,283,812	$1,119,895
Net income	550,367	473,589
Dividends:		
Preferred 7 per cent	243,600	243,600
Common 4 per cent	154,400	154,400
	$398,000	$398,000
Balance of net income	$152,367	$75,589

*Includes $79,393 freight revenue from Maine Central Railroad covering period prior to January 1, 1918, in final adjustment in divisions as per contract of 1913. Does not include $26,486 increased mail revenue applying to period prior to January 1, 1918, which has been credited to profit and loss during 1920 on instructions of the Interstate Commerce Commission.

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare with 1919 as follows:

OPERATING REVENUES

	1920	1919
Freight	$5,240,928	$4,063,169
Passenger	1,117,246	953,917
Total operating revenues	$6,675,481	$5,287,300

OPERATING EXPENSES

	1920	1919
Maintenance of way and structures	$1,445,082	$1,177,240
Maintenance of equipment	1,585,035	1,506,244
Traffic expenses	46,782	45,872
Transportation expenses	2,649,211	2,040,865
General expenses	241,921	182,390
Total operating expenses	$6,063,076	$5,027,967
Net revenue from railway operations	$612,404	$259,333
Railway tax accruals	334,670	299,860
Railway operating income	$277,645	Dr. $42,451

PASSENGER TRAFFIC

	1920	1919
Number of revenue passengers carried	684,644	619,471
Number of passenger miles hauled	27,345,129	25,079,846
Average miles carried—revenue passengers	39.94	40.49
Average revenue per passenger mile (cents)	$.04086	$.03804

FREIGHT TRAFFIC

	1920	1919
Number of revenue tons carried	2,154,229	1,969,225
Number of tons carried one mile	242,823,083	235,876,903
Average miles hauled—revenue freight	113.23	119.78
Average revenue per ton-mile	$.02158	$.01723

Authorized to Issue Equipment Securities.—This company has been authorized by the Interstate Commerce Commission to issue conditional sale purchase notes to the amount of $210,057 under the terms of a contract with the National Railway Service Corporation.

CANADIAN PACIFIC.—*Lord Shaughnessy Proposes C. P. R. Operate Canadian National.*—See article on this subject on another page.

CENTRAL VERMONT.—*Annual Report.*—The corporate income account after taking into consideration standard return for January and February and guaranty for guaranty period shows a net deficit for 1920 of $425,042 as compared with a net income in 1919 of $80,305.

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare with 1919 as follows:

OPERATING REVENUES

	1920	1919
Freight	$5,480,247	$4,524,675
Passenger	1,461,812	1,197,307
Total operating revenues	$7,726,522	$6,288,387

OPERATING EXPENSES

	1920	1919
Maintenance of way and structures	$1,443,076	$1,270,494
Maintenance of equipment	2,198,424	1,535,408
Traffic	138,605	105,177
Transportation	5,103,882	3,739,450
General	286,039	232,499
Total operating expenses	$9,193,474	$6,907,961
Net from railway operations	Def. $1,466,952	Def. $619,574
Taxes	236,446	194,981
Net railway operating income	Def. $1,967,156	Def. $910,923

FREIGHT TRAFFIC

	1920	1919
Revenue train miles	1,030,974	906,216
Freight earnings	$5,480,247	$4,524,675
Earnings per freight train mile	$5.32	$4.99
Tons carried	4,870,160	4,037,076
Tons carried one mile	369,496,598	298,416,307
Earnings per ton mile	1.48 cents	1.52 cents

PASSENGER TRAFFIC

	1920	1919
Revenue train miles	1,096,540	1,037,703
Passenger earnings	$2,012,095	$1,606,409
Earnings per passenger train mile	$1.83	$1.55
Passengers carried	1,470,347	1,368,709
Passengers carried one mile	45,294,652	39,541,851
Earnings per passenger per mile	3.23 cents	3.02 cents

CHICAGO & EASTERN ILLINOIS.—*Confirmation of Sale Deferred.*—Confirmation of the sale of this road, scheduled to take place in Chicago on May 3, before United States Judge Carpenter, met strong opposition from the Mechanics and Metals National Bank, through Isaac H. Mayer, its counsel in Chicago. The court refused the motion of Attorney George W. Murray on behalf of the reorganization managers to approve the reorganization plan in its entirety. The bank's claims as a creditor were expressly reserved for future consideration, and the matter was referred to Master in Chancery C. B. Morrison.

CHICAGO & WESTERN INDIANA.—*Lessees Authorized to Guarantee Bonds.*—The Interstate Commerce Commission has granted the applications of the Chicago & Eastern Illinois; Chicago, Indianapolis & Louisville; Wabash; Grand Trunk Western, and the Chicago & Erie, for authority to assume obligation or liability in respect of $7,000,000 of Chicago & Western Indiana collateral trust bonds, by entering into a joint supplemental lease with that company under which each applicant agrees to pay $5,000 monthly to the trustee under the collateral trust indenture for the purpose of satisfying certain sinking fund requirements thereof.

CHICAGO, BURLINGTON & QUINCY.—*Northern Pacific-Great Northern Bonds Oversubscribed.*—Representatives of the syndicate offering the Northern Pacific-Great Northern $230,000,000 bonds, state that those who have subscribed up to $100,000 will get the full amount of their subscriptions. Because of the oversubscription, which is reported to be between 10 per cent and 12 per cent, some of the largest subscribers will be scaled down in the allotments. Announcement of these allotments and of the division of subscriptions on the three issues, made available under the terms of the offering, will not be made, syndicate bankers said, probably until next Monday, when a complete history of the subscriptions, in tabulated form, will be made public.

CHICAGO, MILWAUKEE & ST. PAUL.—*Loan Approved.*—The Interstate Commerce Commission has approved a loan of $10,000,000 to this company from the revolving fund to enable it to meet maturing indebtedness.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—*Authorized to Acquire E. I. & T. H.*—The Interstate Commerce Commission has issued a decision approving and authorizing the acquisition by this company of the control of the Evansville, Indianapolis & Terre Haute by purchase of its entire capital stock for $1,000,000 as of January 1, 1921.

DELAWARE, LACKAWANNA & WESTERN.—*Stockholders to Vote on Stock Dividends.*—A special stockholders' meeting will be held July 21, to vote for the approval of plans relative to capitalization of $45,000,000 of the road's surplus. If the stock increase

is approved as expected, directors will meet on July 28 and declare a stock dividend to holders of the company's $42,220,550 outstanding stock.

The New York Times had an article last Friday, to the effect that there has been considerable dissatisfaction among the Lackawanna stockholders over the ruling of the I. C. C., which allowed the capitalization of only $45,000,000 of the company's $90,461,776 surplus. The Times' story said:

> They hold, and they are approved in this by their officers and directors, that the stockholder has a greater equity in the surplus than have the stockholders in the surpluses of many other railroads. This, it is asserted, is due to the fact that the D. L. & W. has followed the plan of leasing in perpetuity about 70 per cent of its mileage, for which it pays a yearly rental of $4,000,000. These properties have been developed out of earnings rather than as the result of bond issues, which is the usual railroad practice, and they yield the road in the neighborhood of $12,000,000 a year. Much of the difference between this figure and the rental has grown into surplus. In the case of many other roads, they assert that the development of properties has been partly out of earnings and partly out of bond issues, while the roads have been acquired through the issuance of bonds. This has in many instances set up a heavy burden of interest charges, and it has been the policy of the Interstate Commerce Commission to require such roads to maintain surpluses in proportion with such charges. The Lackawanna holders feel that this is not necessary in the case of their company and that, therefore, they should have been allowed to capitalize their entire surplus.

The ruling of the Interstate Commerce Commission authorizing the Lackawanna stock dividend was given in the *Railway Age* of April 22, page 995.

The stockholders will also vote on the segregation of the company's coal properties. The company filed its acceptance of the Pennsylvania state constitution, which contains a provision prohibiting ownership and operation of coal properties by railroads.

DENVER & RIO GRANDE.—*Annual Report.*—The income account for 1920 compares with 1919 as follows:

	1920	1919
OPERATING REVENUES		
Freight	$29,960,561	$24,099,452
Passenger	7,481,518	6,922,474
Total operating revenues	$40,590,345	$33,016,257
OPERATING EXPENSES	1920	1919
Maintenance of Way and Structures	$6,252,620	$4,856,556
Maintenance of Equipment	9,342,746	7,923,546
Traffic	481,576	241,398
Transportation	14,664,166	11,295,477
General Expenses	1,034,204	928,666
Total operating expenses	$32,552,648	$25,753,232
Net operating revenue	$8,037,698	$7,263,024
Railway Tax Accruals	$1,648,663	$1,380,793
Uncollectible revenues	19,042	5,616
Total operating income	$6,369,993	$5,876,616
Standard return	.....	$8,319,377
Compensation, January and February	$1,386,563	.....
Guaranty, estimated amount due	2,373,248	.....
Total non-operating income	$5,461,714	$9,436,844
Gross Income	$11,831,707	$15,313,460
Total deductions	$10,520,771	$17,800,906
Net Income	$1,310,935	$2,487,446

The annual report of the Denver & Rio Grande will be reviewed editorially in an early issue.

DULUTH & IRON RANGE.—*Settlement with Railroad Administration.*—This company has effected a final settlement with the Railroad Administration by which it receives $4,866,000 in full settlement of its claim arising from the period of federal control. The company had claimed $6,420,052.

DULUTH, MISSABE & NORTHERN.—*Settlement with Railroad Administration.*—This company has effected a final settlement with the Railroad Administration by which it receives $8,525,000 in full settlement of its claim for the period of federal control. The company had claimed $12,104,397.

EAST ST. LOUIS JUNCTION.—*Asks Authority to Issue Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $85,000 of 7 per cent promissory notes for advances made by the St. Louis National Stock Yards Company to meet the 1920 payroll including back pay.

EVANSVILLE, INDIANAPOLIS & TERRE HAUTE.—*Purchase by C. C. C. & St. L. Approved.*—See Cleveland, Cincinnati, Chicago & St. Louis above.

Certificate Not Required for Acquisition of E. & I. Line.—The Interstate Commerce Commission has decided that the proposed acquisition and operation by this company of a line heretofore owned and operated by the Evansville & Indianapolis does not require the issuance of a certificate of public convenience and necessity.

GRAND TRUNK.—*Stockholders Meeting.*—A special meeting of stockholders will be held in London on May 12, to consider a proposed amendment to the agreement entered into March 8, 1920, with the Canadian Government. The amendment extends the time for arbitration proceedings to determine the price to be paid by the government for Grand Trunk shares on condition that the present directors resign in favor of government representatives. This bill has passed the Canadian House of Commons and is awaiting action by the Senate. Acceptance of the new agreement will clear the way for immediate government control, after which the unpaid Grand Trunk interest due in April, will likely be paid. Interest due May 1, including that on obligations bearing provincial guarantees, has been paid.

KANSAS CITY TERMINAL.—*Asks Authority to Issue Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $2,000,000 of ten year 6½ per cent notes secured by the pledge of $3,125,000 of first mortgage 4 per cent bonds. The proceeds are to be used in part to retire an issue of $2,500,000 of 4½ per cent notes maturing July 1. The new notes are to be sold through E. H. Rollins & Sons and the Continental & Commercial Trust Company of Chicago.

LEHIGH & HUDSON RIVER.—*Annual Report.*—The annual report for the year ended December 31, 1920, shows the following income account:

		1920	1919
Railway operating revenues, ten months		$2,780,302	
Railway operating expenses, ten months		2,378,244	
Revenue from railway operation, ten months		$402,058	
Less—			
Hire of equipment—Balance	$168,054		
Joint facility rents	114,940		
		282,994	
		$119,064	
Income from lease of road (U. S. R. R. Administration), two months		86,562	
Income from other sources		54,112	
Income, U. S. Government guaranty period		386,836	
		$646,574	
Deductions—			
Taxes	$106,731		
Interest on debt (due and accrued)	184,369		
		291,101	
Net income transferred to profit and loss		$355,473	$231,193
Dividends (6 per cent, 1920; 12 per cent, 1919)		103,170	206,340

The operating revenues and expenses in detail and the principal traffic statistics for the year ended December 31, 1920, compare with the preceding year as follows:

	1920	1919
OPERATING REVENUES		
Freight	$2,984,251	$2,545,342
Passenger	52,240	49,259
Total operating revenues, inc. other	$3,146,209	$2,687,526
OPERATING EXPENSES	1920	1919
Maintenance of way and structures	$394,109	$323,186
Maintenance of equipment	607,442	503,321
Traffic expenses	23,711	20,053
Transportation expenses	1,651,475	1,125,756
General expenses	95,667	70,277
Total operating expenses	$2,772,404	$2,042,593
Net revenue from railway operation	$373,805	$644,933
PASSENGER TRAFFIC		
Number of passengers carried	146,984	133,652
Number of passengers carried one mile	1,705,329	1,705,222
Average distance hauled per passenger (miles)	11.7	12.8
Average receipts per passenger per mile (cents)	3.1	2.9
FREIGHT TRAFFIC		
Number of tons carried	5,927,454	5,322,354
Number of tons carried one mile	409,680,013	383,194,047
Average distance hauled per ton (miles)	69.2	71.9
Average receipts per ton per mile (mills)	7.3	6.6

LOUISVILLE & NASHVILLE.—*Asks Loan from Revolving Fund.*—This company has applied to the Interstate Commerce Commission for a loan of $5,000,000 for 15 years, of which it is desired to apply $4,000,000 on the purchase of freight equipment to the amount of $12,324,258 and $1,000,000 on additions and betterments on the Cumberland & Eastern Kentucky divisions, which will amount to $4,204,139.

New Directors.—J. R. Kenly and Frederick R. Scott have been elected directors.

LEHIGH VALLEY.—*Extension Granted.*—The United States District Court has granted this company an extension of 60 days, until June 24, for filing its segregation plan.

MISSOURI, KANSAS & OKLAHOMA.—*Deferred Interest to be Paid.*—Notice has been received by the New York Stock Exchange that the interest on this company's guaranteed first mortgage 5 per cent, forty-year gold bonds, matured November 1, 1920, will be paid on presentation of coupons on and after April 30, 1921, and that payment of interest due May 1, 1921, will be deferred. Notice was also received that interest matured November 1, 1920, on the Dallas & Waco Railway Company's guaranteed first mortgage bonds due 1940, will be paid on April 30, 1921, and that May 1 interest will be deferred.

MUSKEGON RAILWAY & NAVIGATION COMPANY.—*Authorized to Issue Securities.*—This company has been authorized by the Interstate Commerce Commission to issue and sell $304,900 of common capital stock and $304,900 of first mortgage 6 per cent bonds, for the purpose of completing extensions to its road from Muskegon to Muskegon Heights, Mich.

PENNSYLVANIA.—*Asks Loan from Revolving Fund.*—This company has applied to the Interstate Commerce Commission for a loan of $5,700,000 for 15 years to enable it to reimburse the treasury for the payment of obligations of subsidiary companies. The company offers as collateral security some stock of the Philadelphia, Baltimore & Washington. The Pennsylvania on May 27, 1920, applied to the commission for a loan of $18,000,000. It received a loan of $6,780,000 for expenditures on roadway and structures and it was proposed to apply $11,000,000 on the purchase of new equipment, but the loan for new equipment was not pressed and the company now desires $5,700,000 to meet maturing obligations. The Pennsylvania's application gives a statement of its accounts with the Railroad Administration, showing a total of $214,787,420 due from the government as of December 31, 1920, and $236,130,681 due to the government, including several amounts which may be funded. The company had received from the administration $20,000,000 on account in 1920 and $35,000,000 since the first of the year. The application also states that the company has received $53,000,000 on account of its guaranty for the six months period of 1920 and that there is still due $45,988,622.

Asks Authority to Guarantee Bonds.—This company has applied to the Interstate Commerce Commission for authority to guarantee the principal and interest of $3,876,000 of refunding mortgage bonds of the Long Island.

READING COMPANY.—*Decision on Segregation Plan Withheld.*—After a hearing Monday on modification of the plan for dissolution of the Philadelphia & Reading Coal & Iron Company and other concerns from the Reading Railway interests, Judges Buffington, Davis and Thompson reversed decision in the United States District Court at Philadelphia. The court asked the Reading Company and the government to file a modified plan within ten days.

In beginning the discussion, William Clark Mason, of counsel for the Reading Company, said that since the last hearing in the case conferences between representatives of the government and representatives of the Reading Company had resulted in the elimination of two points which were to have been discussed. One, he said, was an agreement that the stockholders should not be required to pay 10 per cent to the bondholders for the release of the coal property from the lien of the general mortgage and the other was for keeping the stock intact and the Reading Company assigning its equity in the stock to a new corporation and issuing certificates of interest to the stockholders benefiting under the dissolution plan.

Allan McCarthy, counsel for the Prosser Committee, presented the side of the common stockholders. He spoke on the new proposed modification of the plan to place the stock of the coal company in the hands of a trustee for the Reading Company, subject to the jurisdiction of the court so that the property may be sold in time at its full market value.

The brief submitted on behalf of defendant Reading Company gives the following points:

1—(a) The sale provided for in paragraph five of the Reading plan is such a disposition of the interest of the Reading Company in the stock of the Philadelphia & Reading Coal & Iron Company, as accomplishes the expressed purpose of the mandates of the Supreme Court of the United States requiring disposition by the Reading Company of such stock, (b) such disposition does not confer on any one class of stockholders of the Reading Company any benefit to the prejudice of the legal rights of any other class of stockholders.

2—The stock of the coal company need not be sold free from the lien of the general mortgage. A sale of certificates of interest therein would be a compliance with the provisions aforesaid of the mandate of the Supreme Court of the United States.

3—In view of the expressed opposition of bondholders and stockholders it is believed the Reading Company should not offer a premium of 10 per cent to the general mortgage bondholders for the release of the coal company's property from the lien of the general mortgage and the requirement of the mandate of the Supreme Court of the United States may be fulfilled by proper injunctive provisions in the decree to be entered in this cause.

RUTLAND RAILROAD.—*New Director.*—E. J. Pearson, of New Haven, Conn., has been elected a director, succeeding George F. Baker, of New York.

ST. LOUIS SOUTHWESTERN.—*Authorized to Issue Promissory Notes.*—The Interstate Commerce Commission has authorized this company and the St. Louis Southwestern of Texas to issue joint promissory notes to the amount of $384,990 in connection with the purchase of 10 locomotives from the Baldwin Locomotive Works.

TOLEDO, PEORIA & WESTERN.—*Annual Report.*—The operating revenues and expenses for the year ended December 31, 1920, compare with the preceding year as follows:

OPERATING REVENUES	1920	1919
Freight	$1,285,608	$961,829
Passenger	630,174	592,599
Total operating revenues	$2,090,667	$1,645,768
OPERATING EXPENSES		
Maintenance of way and structures	$382,554	$335,955
Maintenance of equipment	676,494	517,549
Traffic expenses	36,154	25,131
Transportation expenses	1,249,355	857,896
General expenses	97,024	65,621
Total operating expenses	$2,441,420	$1,799,407
Net revenue from railway operations	Def. $350,753	Def. $153,639
Ratio of operating expenses to operating revenues	116.78	109.34
Railway tax accruals	122,000	102,000
Railway operating deficit	472,753	255,639

The principal traffic statistics for 1920 compare with 1919 as follows:

FREIGHT TRAFFIC	1920	1919
Number of tons carried	1,292,232	1,006,279
Number of tons carried one mile	89,521,551	68,953,481
Average distance hauled per ton (miles)	69.28	68.52
Average receipts per ton per mile (cents)	1.44	1.40
PASSENGER TRAFFIC		
Number of passengers carried	846,295	843,847
Number of passengers carried one mile	20,982,536	20,367,659
Average distance hauled per passenger (miles)	24.79	24.14
Average receipts per passenger per mile (cents)	3.00	2.91

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial payments on account of the railroad guaranty for six months of 1920, as follows:

Charleston & Western Carolina	$260,000
Chicago, Terre Haute & Southeastern	26,000
Cincinnati, Indianapolis & Western	230,000
Hawkinsville & Florida Southern	10,000
Illinois Central	2,000,000
Missouri & North Arkansas	22,500
Norfolk & Western	2,000,000
Northern Alabama	80,000
Philadelphia & Reading	350,000
San Antonio, Uvalde & Gulf	65,000
Sullivan County	17,000
Texas Short Line	6,000
Western Maryland	400,000
Wrightsville & Tennille	75,000

Dividends Declared

Cleveland & Pittsburgh—Guaranteed, 1¾ per cent, quarterly; special guaranteed, 1 per cent, quarterly; both payable June 1 to holders of record May 10.

Delaware & Hudson—2¼ per cent, quarterly, payable June 20, to holders of record May 28.

Elmira & Williamsport—Common, 2.26; payable May 2 to holders of record April 20.

Illinois Central—1¾ per cent, quarterly, payable June 1 to holders of record May 6.

Norfolk & Western—Common, 1¾ per cent, quarterly, payable June 18 to holders of record May 31.

SALARIES OF RAILROAD OFFICERS would be limited to $15,000 a year, unless a higher figure were approved by the Interstate Commerce Commission if congress should pass a bill introduced on April 25 by Representative Black of Texas.

Railway Officers

Financial, Legal and Accounting

Henry L. Stone, general counsel of the Louisville & Nashville, with headquarters at Louisville, Ky., whose retirement from active railroad service was announced in the *Railway Age* of April 8 (page 916), was born in Bath County, Ky., on January 17, 1842. He was educated at Bainbridge Academy and at the law school conducted by Messrs. Gordon and Coburn in Indianapolis, Ind. Mr. Stone was engaged in the private practice of law and as city attorney of Louisville, Ky., from the close of the Civil War until January, 1905. On the latter date he was appointed general counsel of the Louisville & Nashville, and has served in this position continuously since that time. In addition to his duties as general counsel of the Louisville & Nashville, Mr. Stone, on two occasions, has been chairman of boards of attorneys appointed to consider and make recommendations upon proposed acts of Congress, enlarging the powers of the Interstate Commerce Commission.

Col. H. L. Stone

Executive

W. S. Lee, vice-president of the Piedmont & Northern, has been elected president, effective April 26, succeeding Z. V. Taylor, deceased.

Edward S. Jouett, whose election as vice-president and general counsel of the Louisville & Nashville, with headquarters at Louisville, Ky., was announced in the *Railway Age* of April 29 (page 1055), was born at Winchester, Ky., on October 21, 1863. He was educated in the public schools of Winchester and at the University of Virginia, graduating from the law school of that institution in 1885. He became a member of the bar in Winchester and practised there and throughout Kentucky until September 1, 1912, when he entered railroad service as general attorney of the Louisville & Nashville, with headquarters at Louisville. He was appointed general solicitor in charge of the law department of the Louisville & Nashville during the period of federal control, and served in this position until the railroads were returned to private management, when he was appointed assistant general counsel of the Louisville & Nashville system. He was serving in this position at the time of his recent election as vice-president and general counsel.

E. S. Jouett

C. D. Mackay has been appointed assistant to the vice-president of the Southern, with headquarters at Washington, D. C., effective May 1, and will be charged with the duties hitherto entrusted to **George R. Loyall,** who has resigned as assistant vice-president to accept service elsewhere.

Charles T. O'Neal has been appointed receiver of the Fort Smith & Western, with headquarters at Fort Smith, Ark., effective April 15. Mr. O'Neal was born at Brandywine Springs, Del., and entered railroad service in 1890 as a clerk in the offices of the Philadelphia & Reading. In 1891 he entered the service of the Lehigh Valley, serving in various capacities until 1903, when he was appointed trainmaster on the Pennsylvania division. In 1905 he was transferred to the New Jersey and Lehigh division, and in 1906 was promoted to superintendent of the New York division. From 1908 to 1916, Mr. O'Neal served as superintendent of the Buffalo division and the Lehigh Valley Transportation Company. He was promoted to general superintendent in 1917, and served both in that capacity and as assistant vice-president and marine manager until 1919, when he was appointed manager of terminals of the various roads running to the Niagara frontier by the United States Railroad Administration. At the time of his appointment as receiver of the Fort Smith & Western, Mr. O'Neal was serving as assistant to the Director General of railroads, being assigned to the settlement of claims arising during federal control, with headquarters at Washington, D. C.

Operating

J. S. Jones has been appointed trainmaster of the Chicago, Rock Island & Pacific, with headquarters at El Reno, Okla., effective May 1, succeeding C. F. Radans, who has been assigned to other duties.

C. E. Lanham has been appointed superintendent of car service of the Gulf, Mobile & Northern, with headquarters at Mobile, Ala., effective May 1, succeeding D. W. Davis, assigned to other duties.

F. Wear, superintendent of the Butte division of the Great Northern with headquarters at Great Falls, Mont., will also act as superintendent of the Havre division, effective May 1, succeeding **J. L. Close,** who has been transferred to the Breckinridge division with headquarters at Breckinridge, Minn.

E. W. Hoffman, general superintendent of the Chicago terminal of the Baltimore & Ohio, has been transferred to the Northwest district with headquarters at Cleveland, O., succeeding **E. A. Peck,** who has been transferred to the Pennsylvania district, with headquarters at Pittsburgh, effective May 1.

J. F. Anderson, superintendent of the Kansas City Terminal division of the Chicago, Milwaukee & St. Paul, with headquarters at Kansas City, Mo., has been appointed assistant superintendent of the Kansas City division, with the same headquarters, the Kansas City Terminal division having been consolidated with the Kansas City division, and the position of superintendent abolished.

E. Thwaites has been appointed superintendent of the Cleveland division of the New York Central with headquarters at Cleveland, Ohio, succeeding F. H. Wilson, resigned to accept service with another company. **F. F. Riefel** has been appointed superintendent of the Toledo division with headquarters at Toledo, Ohio, succeeding Mr. Thwaites. **E. W. Brown** has been appointed superintendent of the Alliance division with headquarters at Alliance, Ohio, succeeding **A. E. Lloyd,** who has been appointed superintendent of the Michigan division with headquarters at Elkhart, Ind., succeeding F. F. Riefel.

A. E. Macdonald, superintendent of the Canadian National, with headquarters at Dauphin, Man., has been transferred to Saskatoon, Sask., succeeding R. King, assigned to other duties. **T. J. Brown,** superintendent, with headquarters at Calgary, Alta., has been transferred to Dauphin, Man., suc-

ceeding Mr. Macdonald. **J. P. Johnson,** assistant superintendent, with headquarters at Melford, Sask., has been transferred to Prince Albert, Sask. **E. W. Cameron,** assistant superintendent, with headquarters at Humboldt, Sask., has been given additional jurisdiction over the Humboldt sub-division, the Battleford sub-division and the Carlton sub-division. The appointments and changes were effective May 1.

D. S. Farley, whose promotion to assistant general manager of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., was announced in the *Railway Age* of April 15 (page 964), was born at Albion, Mich., on June 24, 1870. He entered railway service on October 15, 1887, as a yard clerk for the Atchison, Topeka & Santa Fe at Denver, Colo., and his entire railroad career has been spent in the service of this company. In August, 1899, after serving as switchman and in various positions in the station service at Denver, he was made chief clerk at Pueblo, Colo., where he served until May, 1900. At that time he was transferred to Kansas City, Mo., where he served until August, 1907, when he was promoted to superintendent, with the same headquarters. He was transferred to Amarillo, Tex., on June 1, 1915. At the time of his recent promotion Mr. Farley was serving as superintendent with headquarters at Dodge City, Kan., where he had been transferred in June, 1920.

D. S. Farley

O. E. Coyne, whose appointment as superintendent of the Illinois division of the Missouri Pacific, with headquarters at Illmo, Mo., was announced in the *Railway Age* of April 1 (page 869), was born on November 2, 1876, at Broadwell, Ill., and entered railway service in May, 1892, as a telegraph operator for the Chicago & Alton. In 1899 he became a train dispatcher for the Grand Trunk, Western lines, remaining in the service of that road until 1902, when he went with the St. Louis, Iron Mountain & Southern, in a similar capacity. From 1905 to 1908 Mr. Coyne served as train dispatcher for the Atchison, Topeka & Santa Fe and in the latter year was appointed chief dispatcher for the Missouri Pacific. At the time of his recent promotion, Mr. Coyne was serving as trainmaster, to which position he had been promoted in 1913. He served with the American Expeditionary Forces during the war, being commissioned a captain in the Railway Transportation Corps. From March, 1919, to June, 1920, he had charge of the terminal switching at the port of St. Nazaire, France.

William K. Etter, whose promotion to assistant to the vice-president in charge of operation of the Atchison, Topeka & Santa Fe was announced in the *Railway Age* of April 15 (page 961), was born at Shippensburg, Pa., on January 16, 1874. He was educated at McPherson College and entered railway service in June, 1891, as a rodman for the Atchison, Topeka & Santa Fe. During the next two years Mr. Etter served successively as stenographer, clerk, timekeeper and chief clerk to the superintendent at various points on the Santa Fe. In February, 1901, he was made chief clerk to the superintendent, with headquarters at Needles, Cal., and a few months later was appointed chief clerk to the general superintendent at La Junta, Colo. In September, 1902, he was transferred to Topeka, Kan., where he served until August, 1905, when he was promoted to trainmaster, with the same headquarters. In January, 1906, Mr. Etter was promoted to superintendent of the Rio Grande division, with headquarters at San Marcial, N. M. He was transferred to the Oklahoma division, with headquarters at Arkansas City, Kan., in October, 1907. Mr. Etter was promoted to general superintendent, with headquarters at Newton, Kan., in September, 1916. At the time of his recent promotion, he was serving as assistant general manager, with headquarters at Topeka, Kan., to which position he had been promoted in November, 1918.

Traffic

W. J. Cartwright has been appointed commercial agent of the Southern with headquarters at Chattanooga, Tenn., succeeding R. D. Miller, transferred, effective May 1.

E. G. Heilbronner has been appointed general freight and passenger agent of the Pittsburgh, Lisbon & Western, with headquarters at Lisbon, Ohio.

D. B. Hevron has been appointed district freight agent of the Southern, with headquarters at Evansville, Ind., succeeding J. T. Mudd, who has resigned.

H. F. Kern, general agent of the Southern Pacific with headquarters at Kansas City, Mo., has been transferred to a similar position at Cincinnati, O. **L. B. Banks** succeeds Mr. Kern at Kansas City.

H. P. Thrall, mail traffic manager and service inspector of the Southern Pacific, with headquarters at San Francisco, Cal., has been appointed mail and express traffic master, with the same headquarters, effective April 23.

J. P. Tocher has been appointed division freight agent of the Southern with headquarters at Louisville, Ky. **J. N. Templeton** has been appointed to a similar position at Lexington, Ky. The following have been appointed commercial agents: **W. T. Keating,** at Indianapolis, Ind.; **R. D. Miller,** at Chattanooga, Tenn.; and **G. B. Miller,** at Anniston, Ala. These appointments were effective April 15.

W. Humphreys, whose promotion to general western freight agent of the Southern, with headquarters at Chicago, was announced in the *Railway Age* of April 15 (page 963), was born at Louisville, Ky., on January 6, 1876. He entered railway service in August, 1898, in the traffic department of the Southern, and has served in various positions in that department at Cincinnati, Ohio, Mobile, Miss., Evansville, Ind., and New York City. At the time of his recent promotion, Mr. Humphreys was serving as division freight agent with headquarters at Louisville, Ky.

Fred S. Reigel, whose promotion to general freight agent of the Southern, with headquarters at Cincinnati, Ohio, was announced in the *Railway Age* of April 15 (page 963), was born at Louisville, Ky., on April 21, 1879, and entered railway service in August, 1899, as a messenger in the local freight offices of the Southern at Louisville. In March, 1905, he was made rate clerk in the assistant freight traffic manager's office at Louisville, and the following year was promoted to chief clerk to the assistant general freight agent, with the same headquarters. In December, 1911, he was made assistant chief clerk to the assistant freight traffic manager, and in June of the following year was promoted to chief clerk in the same office. In July, 1916, in addition to his other duties, Mr. Reigel was made acting assistant general freight agent at Louisville, and in June, 1917, he was promoted to assistant general freight agent, with headquarters at Cincinnati, Ohio. He was serving in this position at the time of his recent promotion.

Mechanical

E. C. Huffman, superintendent of the Great Northern with headquarters at Breckinridge, Minn., has been appointed master mechanic of the Sioux City division with headquarters at Sioux City, Ia., effective May 1, succeeding F. J. Fero, deceased.

T. E. Paradise, assistant superintendent of motive power of the Chicago, Burlington & Quincy, with headquarters at Lincoln, Neb., has been appointed master mechanic with headquarters at Hannibal, Mo., succeeding **H. Modaff** who

has been transferred to Ottumwa, Ia. The position of assistant superintendent of motive power at Lincoln, has been abolished. Mr. Modaff succeeds **H. D. Turner** who has been appointed road foreman of engines with headquarters at Burlington, Ia. These changes are effective May 1.

Engineering, Maintenance of Way and Signaling

D. C. Fenstermaker, district engineer of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been granted a leave of absence effective April 16, to become associated with Peterson Brothers, contractors, Omaha, Neb., who will construct a new branch line in Cuba for the United Fruit Company.

William Hood, chief engineer of the Southern Pacific, with headquarters at San Francisco, Cal., has retired from active railroad service, effective May 3, after 54 years of service. **G. W. Boschke,** assistant chief engineer, succeeds Mr. Hood. A sketch of Mr. Boschke's career appeared in the *Railway Age* of February 11, 1921 (page 394).

William Morrison, assistant signal engineer of the electric division of the New York Central, with headquarters at New York City, has been appointed assistant engineer, with the same headquarters, effective April 16, and the position of assistant signal engineer has been abolished. Effective this date **J. Stolz,** supervisor of signals of the electric division, was appointed assistant supervisor of signals, with the same headquarters.

C. D. Cronk, assistant signal engineer of the New York Central, with headquarters at Buffalo, N. Y., has been appointed chief signal inspector, with headquarters at Cleveland, Ohio, and the office of assistant signal engineer has been abolished. **E. A. Black,** chief signal inspector, with headquarters at Cleveland, Ohio, has been appointed supervisor of the Franklin signal district, succeeding **L. L. Whitcomb,** who has been appointed signal supervisor on the Cleveland signal district, succeeding **J. C. Seaman,** who has been appointed signal inspector of the Cleveland signal district.

Purchasing and Stores

H. C. Pearce, director of purchases and stores of the Chesapeake & Ohio with headquarters at Richmond, Va., will serve the Hocking Valley in a similar capacity, effective April 21.

Special

J. A. Rittenhouse, superintendent of the Pullman Company, with headquarters at Philadelphia, Pa., has been transferred to Detroit, Mich., with jurisdiction over the Detroit, Buffalo and Cleveland districts, effective May 1. **W. A. Hartley,** assistant to the assistant general manager, with headquarters at Philadelphia, Pa., has been given jurisdiction over car movements and other matters local to the Philadelphia district. **J. T. Ramsom,** assistant general manager, with headquarters at Washington, D. C., has been given jurisdiction over all matters general in character, affecting the Philadelphia district.

Obituary

Frank H. Davis, vice-president of the Chesapeake & Ohio with office at New York, died at his home in Elizabeth, N. J., on May 2. Mr. Davis was also vice-president of the Hocking Valley and vice-president and treasurer of the Minneapolis & St. Louis.

C. W. Pifer, office engineer, Department of Way and Structures, United States Railroad Administration, with headquarters at Chicago, died at his home on April 21. Mr. Pifer was born at Lafayette, Ind., October 21, 1868, and graduated from Purdue University in 1889. He entered railway service in 1892, with the Pennsylvania. In 1896 he became engineer in charge of special inspections for the Cleveland, Cincinnati, Chicago & St. Louis. Three years later he became assistant engineer of the Illinois Central. In 1914 he was appointed senior civil engineer, Interstate Commerce Commission, and in April, 1920, he was appointed office engineer for the Railroad Administration.

Joseph W. Moore, assistant engineer, valuation department of the Illinois Central and Yazoo & Mississippi Valley, died at the Illinois Central Hospital on April 13, following a protracted illness. Mr. Moore was born at Louisville, Ky., March 20, 1874. He attended the University of Kentucky where he took a special three-year course in engineering. He first entered railway service in August, 1898, in the engineering department of the Louisville & Nashville, with which road he served as rodman, instrumentman, assistant engineer and assistant roadmaster. In 1907 he served for one year as track engineer of the A. & B. Construction Company on the Atlanta, Birmingham & Atlantic and from June, 1908, to November, 1909, was roadmaster of the latter road. He was assistant engineer in the valuation department of the Central of Georgia from March to June, 1910, when he went to the Southern Pacific, Texas and Louisiana lines as roadmaster at Morgan City, La. Mr. Moore became roadmaster of the International & Great Northern at Navasota, Texas, in December, 1914, and in September, 1916, he was appointed pilot engineer in the valuation department of the Illinois Central. In August, 1919, he was appointed assistant engineer in the valuation department of the Illinois Central, which position he held at the time of his death. Mr. Moore served through the second training camp at Plattsburg in the Summer of 1916, and soon after the entrance of the United States into the war he entered the training camp at Camp Grant and was commissioned captain and assigned to command Company "B", 35th Engineers. He served until August, 1919, and following his discharge from service was commissioned Major in the Engineers Reserve Corps.

Elmer A. Howard, vice-president of the Chicago, Burlington & Quincy, died at his home in Chicago, on May 4, after a long illness. Mr. Howard was born at Fairfield, Iowa, on July 18, 1858. He was educated in the public schools and attended the University of Iowa for one year. At the age of 18 he entered the employ of the Burlington as telegrapher and station agent at Fairfield, Iowa, and remained in that position for eight years. In 1885, he entered the Indian service under the Cleveland administration. He resigned as Indian agent in 1887, to go into the banking business at Fairfield, Iowa, and in 1900 was appointed national bank examiner for the state of Iowa. In 1903 he returned to the service of the Burlington, and for seven years served as real estate and industrial commissioner. In November, 1915, he was elected vice-president in charge of the land and industrial departments, which position he held at the time of his death.

E. A. Howard

THE BUREAU OF STANDARDS, Washington, which had been investigating the causes of failure of chilled iron and rolled steel car wheels, using special apparatus for duplicating service conditions and for measuring the temperatures and stresses developed in the wheels, held, last week, several conferences with representatives of the Association of Manufacturers of Chilled Car Wheels for the purpose of preparing a paper on the stresses developed in wheels of this type through the heating of the rim. A representative of the association spent the week at the Bureau going over the data which has already been secured.